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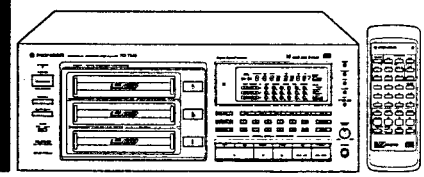
PIONEER®
The Art of Entertainment

Service Manual



ORDER NO.
ARP2727

MULTI – PLAY COMPACT DISC PLAYER

PD-TM3

PD-TM3 HAS THE FOLLOWING:

Type	Power Requirement	Remarks
KU	AC120V only	
KC	AC120V only	
HEM	AC220 – 230V, 230 – 240V (Switchable) *	
SD	AC110V, 120 – 127V, 220V, 240V (Switchable)	

* Change the connection of the power transformer's primary wiring.

- **This manual is applicable to PD-TM3/KU, KC, HEM and SD.**
- **For KC, HEM and SD types, refer to page 51.**

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1. SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).
When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

NOTICE
(FOR CANADIAN MODEL ONLY)
Fuse symbols (fast operating fuse) and/or (slow operating fuse) on PCB indicate that replacement parts must be of identical designation.

REMARQUE
(POUR MODÈLE CANADIEN SEULEMENT)
Les symboles de fusible (fusible de type rapide) et/ou (fusible de type lent) sur CCI indiquent que les pièces de remplacement doivent avoir la même désignation.

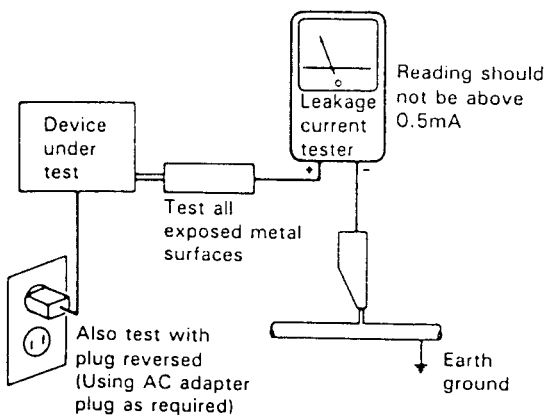
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Reading should not be above 0.5mA
Leakage current tester
Device under test
Test all exposed metal surfaces
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

(FOR EUROPEAN MODEL ONLY)

VARO!
AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.

ADVERSEL:
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

VARNING!
OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.

LASER
Kuva 1
Lasersateilyn varoitusmerkki

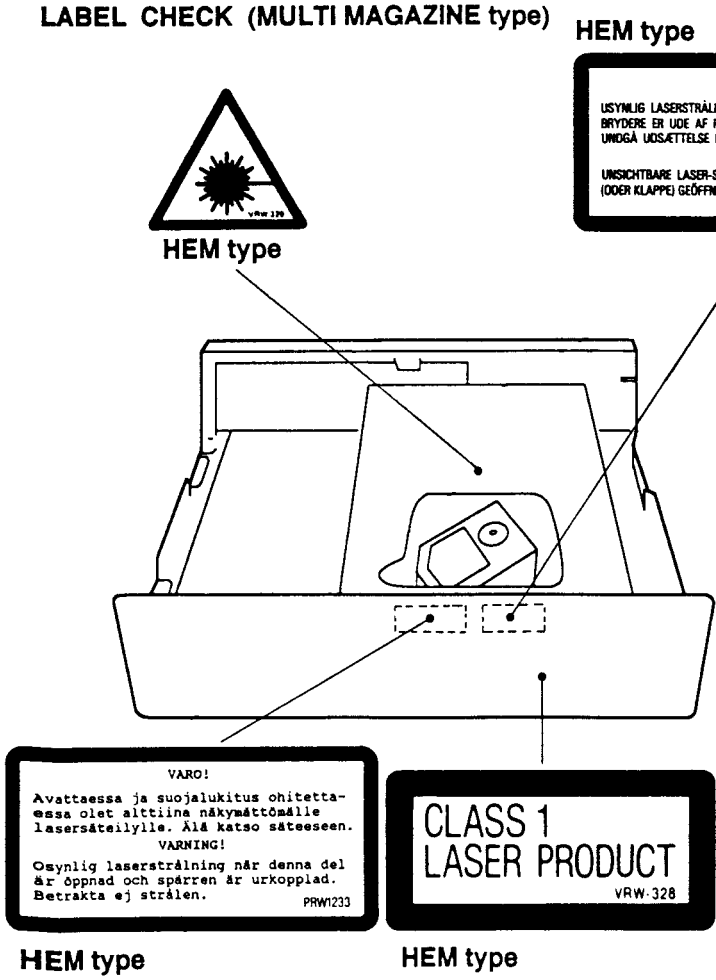
WARNING!
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.

IMPORTANT
THIS PIONEER APPARATUS CONTAINS LASER OF CLASS 1.
SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

LASER DIODE CHARACTERISTICS
MAXIMUM OUTPUT POWER: 5 mw
WAVELENGTH: 780-785 nm

LASER
Picture 1
Warning sign for laser radiation

LABEL CHECK (MULTI MAGAZINE type)


HEM type
ADVARSEL
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHED SAFBRYDERE ER UDE AF FUNKTION.
UNDGÅ UDSÆTTELSE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER-STRAHLUNG TRITT AUS, WENN DECKEL (ODER KLAPPE) GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!
VRW1094
HEM type
VARO!
Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen.
VARNING!
Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad. Betrakta ej strålen.
PRW1233
CLASS 1
LASER PRODUCT
VRW-328
HEM type
HEM type

Additional Laser Caution

1. Laser Interlock Mechanism
   The ON/OFF (ON : low level, OFF : high level) status of the LPS1 and LPS2 signals of Clamp switch (S102) for detecting the loading state is detected by the system microprocessor, and the design prevents laser diode oscillation when the LPS1 signal is not OFF (high level) and LPS2 signal is not ON (low level) (clamped state).
   Thus, interlock will no longer function if the LPS2 signal of Clamp switch (S102) is deliberately shorted to GND.
   Interlock does not also operate in the test mode *.
   Laser diode oscillation will continue, if pins 1 of M51593FP (IC101) on the preamplifier board loaded on PICKUP assembly are connected to GND, or pin 19 is connected to low level (ON), or else the terminals of Q101 are shorted to each other (fault condition).

2. When the cover is opened with the servo mechanism block removed to be turned over, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 laser beam. '92M1A

* Refer to page 42.

2. EXPLODED VIEWS AND PARTS LIST

2.1 EXTERIOR

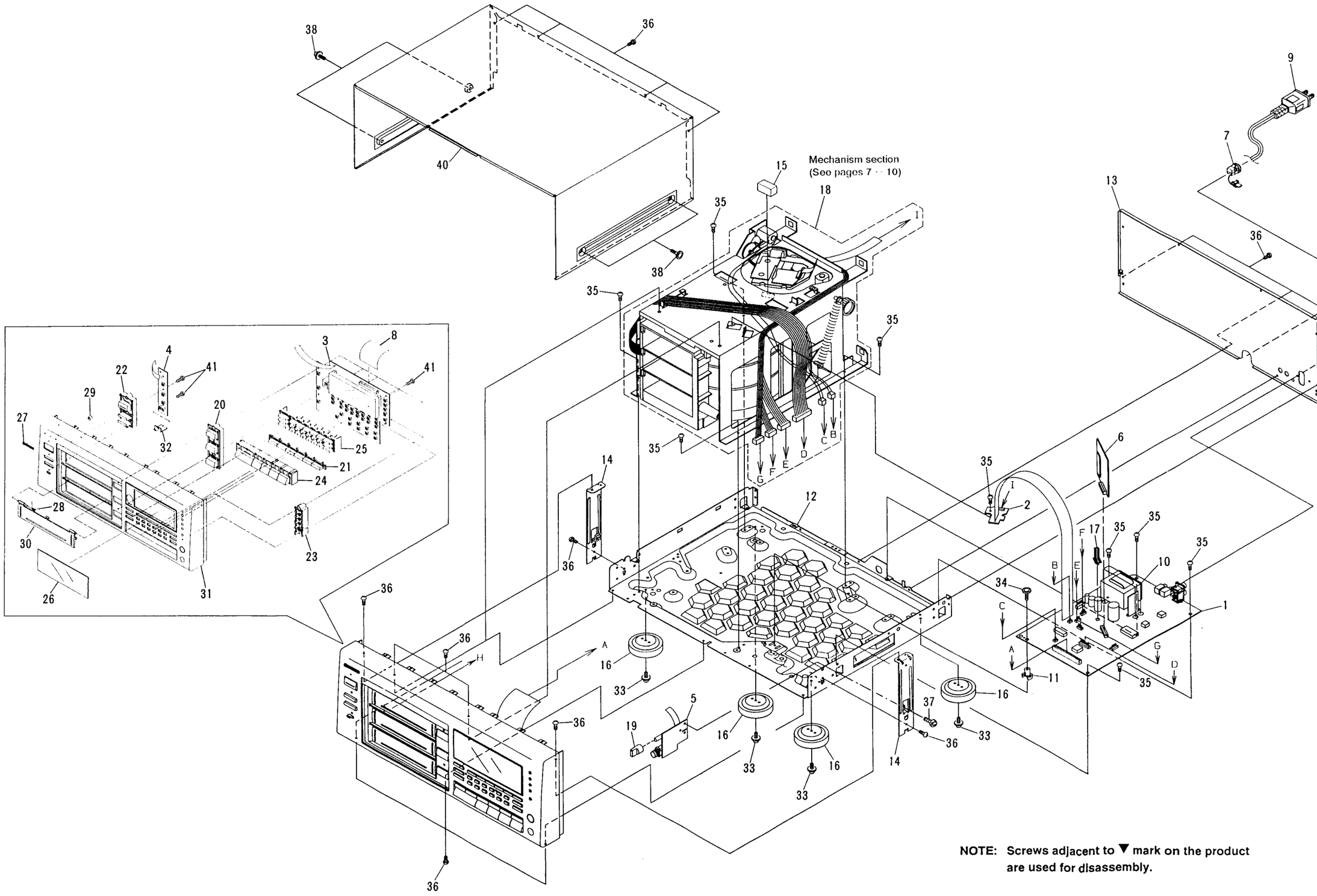
NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

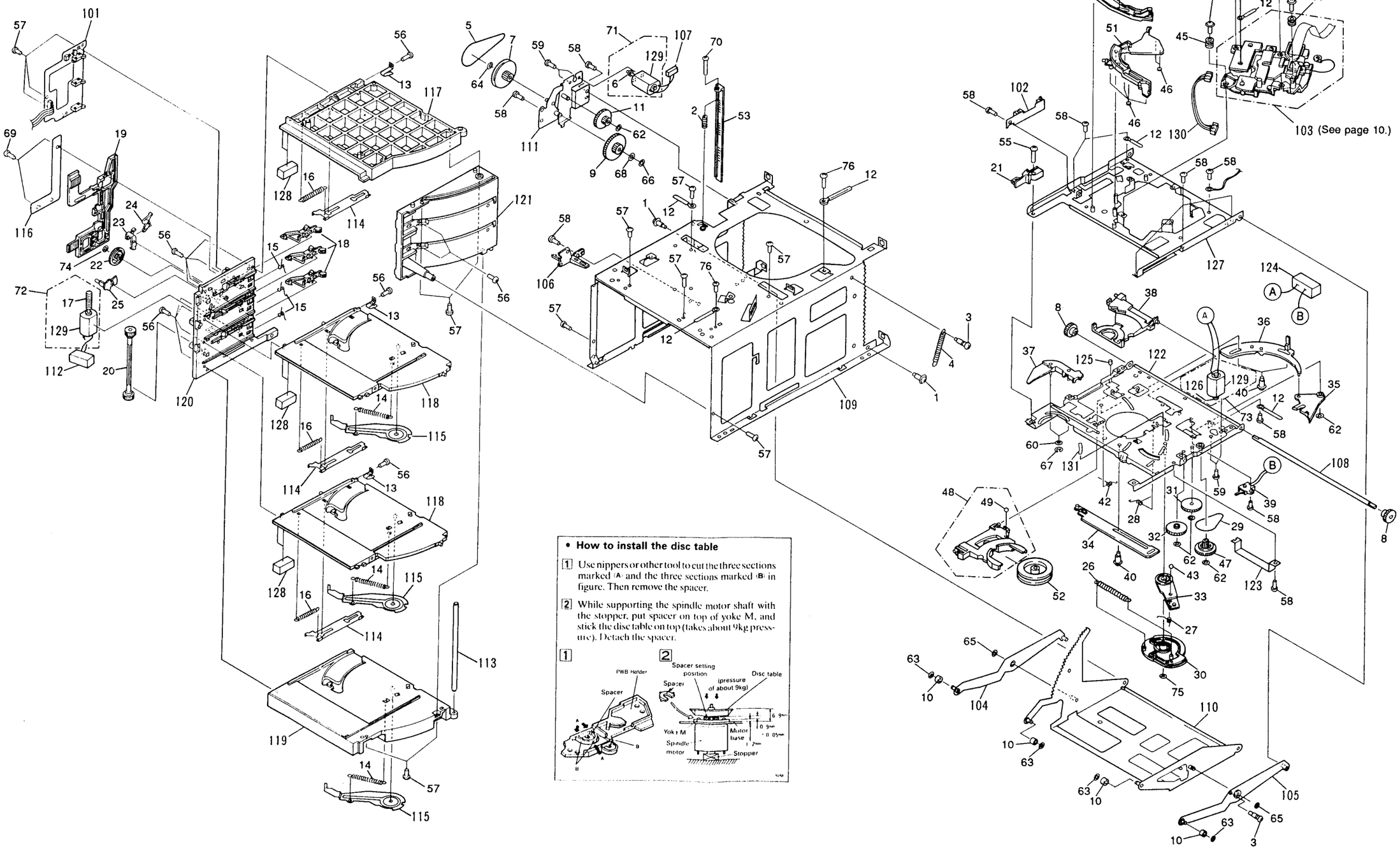
Parts List

Mark	No.	Description	Part No.
	1	Main board assembly	PWZ2569
NSP	2	Connector board assembly	PWZ2573
	3	Display board assembly	PWZ2577
NSP	4	Power SW board assembly	PWZ2579
NSP	5	Headphone board assembly	PWZ2580
	6	DSP board assembly	PWX1288
⚠	7	Strain relief	CM – 22C
	8	36P F.F.C/30V	PDD1149
⚠	9	AC power coed	PDG1015
⚠	10	Power transformer	PTT1282
NSP	11	PCB mold	AMR1525
NSP	12	Under base	PNA1556
NSP	13	Rear base	PNA1931
NSP	14	Side angle	PNB1440
NSP	15	Spacer	PNM1195
	16	Insulator	PNW1912
NSP	17	Card conner holder	PNW2343
NSP	18	3 magazine mechanism assembly	PXA1497
	19	Headphone knob	PAC1600
	20	Eject button	PAC1727
	21	DSP button	PAC1728
	22	Power button	PAC1729
	23	Mode button	PAC1730
	24	Operation button	PAC1731
	25	Select button	PAC1732
	26	Display window	PAM1603
	27	PIONEER badge	PAM1608
	28	Door spring	PBH1022
	29	LED lens	PNW2019
	30	Door	PNW2138
	31	Operation panel	PNW2273
	32	Slide knob	RAC1428
	33	Screw	IBZ30P100FCC
	34	Screw	IBZ30P180FMC
	35	Screw	BBZ30P060FMC
	36	Screw	BBZ30P080FCC
	37	Screw	IBZ30P080FCC
	38	Screw	FBT40P080FZK
	40	Bonnet	PYY1150
	41	Screw	PPZ30P100FMC

Exterior


Mechanism section
(See pages 7 - 10)
NOTE: Screws adjacent to ▼ mark on the product are used for disassembly.

2.2 MECHANISM SECTION



• How to install the disc table

1. Use nippers or other tool to cut the three sections marked (A) and the three sections marked (B) in figure. Then remove the spacer.
2. While supporting the spindle motor shaft with the stopper, put spacer on top of yoke M, and stick the disc table on top (takes about 9kg pressure). Detach the spacer.

Parts List

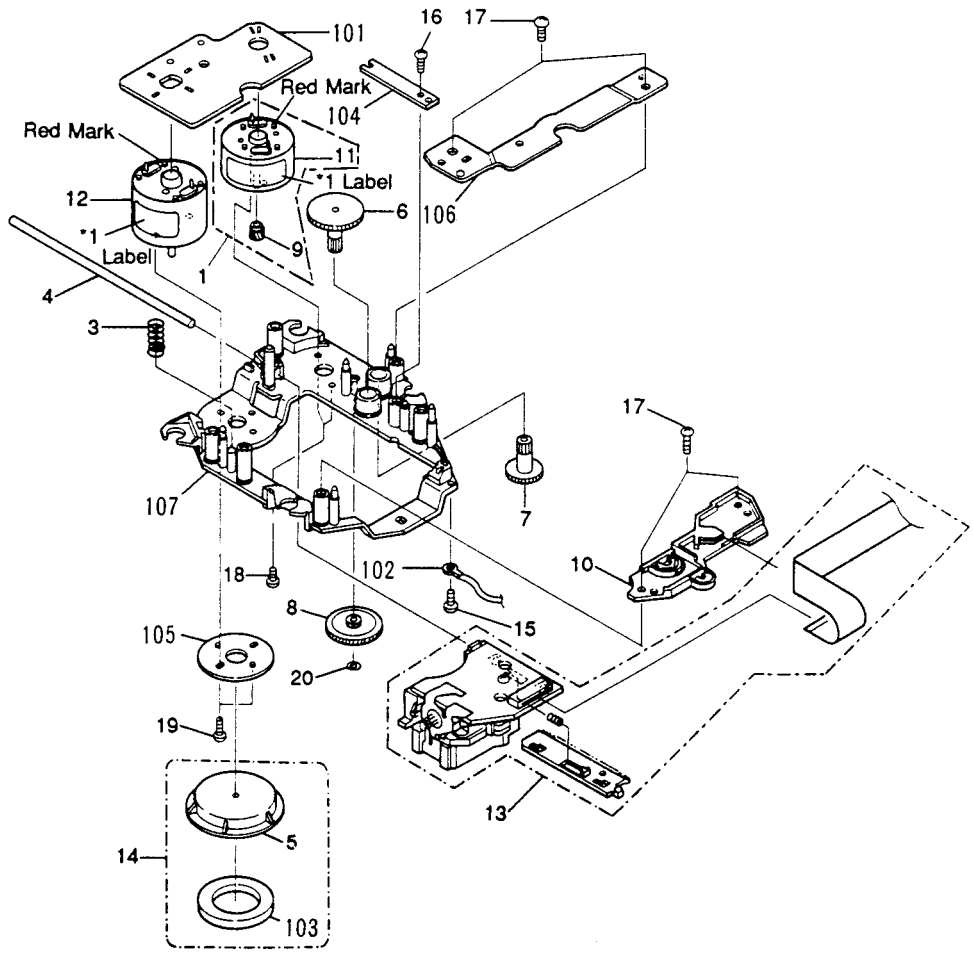
Mark	No.	Description	Part No.
	1	Link screw	DBA1023
	2	Sensor spring	DBH1102
	3	Select screw	PBA1051
	4	Select spring	PBH1116
	5	Belt	PEB1154
	6	Motor pulley	PNW1634
	7	Gear pulley	PNW1960
	8	Synchro gear	PNW1962
	9	Drive gear	PNW2059
	10	Roller	PNW1967
	11	Gear 1	PNW2060
	12	Cord clamper	RNH-184
	13	Holder spring	DBK1028
	14	Eject spring	PBH1130
	15	Lock spring	PBH1117
	16	SM spring	PBH1015
	17	Worm	PNW1220
	18	Lock lever	PNW1956
	19	Eject plate	PNW1957
	20	Synchro gear	PNW1958
	21	Select lever	PNW1959
	22	Worm cam	PNW1961
	23	SW lever A	PNW1964
	24	SW lever B	PNW1965
	25	Drive shaft	PNW1969
	26	Spring	PBH1124
	27	Tension spring	PBH1123
	28	Clamper spring B	DBH1120
	29	Belt	DEB1104
	30	Main gear	DNK1568
	31	Gear A	DNK1569
	32	Gear B	DNK1570
	33	Drive lever	DNK1571
	34	Drive plate	DNK1572
	35	Clamper lever	DNK1573
	36	Clamper cam	DNK1574
	37	Turn drive lever	DNK1577
	38	Clamper holder B	DNK1581
	39	Lever switch (S102) [LOADING POSITION (LPS1, LPS2)]	DSK1003
	40	Screw	PBA-125
	41	Floating screw	PBA1073
	42	Clamper spring T	PBH1016
	43	Steel ball ø4	PBP-001
	44	Floating rubber	PEB1014
	45	Floating rubber	PEB1132
	46	Cushion A	PED1001
	47	Gear pulley	PNW1095
	48	Clamper holder T	PNW1107
	49	Steel ball ø3	PBP-009
	50	Clamp cam	PNW1110
	51	Upper tray	PNW1111
	52	Clamper	PNW1448
	53	Sensor plate	DNK1567
	54	Screw	BMZ26P050FMC
	55	Screw	BMZ26P120FMC
	56	Screw	BPZ20P080FZK
	57	Screw	BBZ30P080FMC
	58	Screw	BSZ26P040FMC
	59	Screw	PMZ20P030FMC
	60	Washer	WA31D054D025
	61	Washer	WA31D054D050
	62	Washer	WT26D047D025
	63	Washer	WT26D054D050
	64	Washer	WT31D054D025
	65	Washer	WT31D054D050
	66	Washer	WT41D065D025
	67	E ring	Z39-010
	68	Washer	PLA1093
	69	Screw	BPZ20P060FMC
	70	Screw	PBA1059
	71	Motor assembly (DISC SELECT)	PEA1248
	72	Motor assembly (EJECT)	PEA1249
	73	Motor assembly (LOADING)	PEA1250
	74	Washer	WT26D047D013
	75	Washer	WT31D054D013
	76	Screw	PDZ30P050FMC
NSP	101	Mechanism PCB assembly	PWM1383
NSP	102	Sensor board assembly	PWM1689
NSP	103	Servo mechanism assembly M	PXA1512
	104	Link L	DNH1296
	105	Link R	DNH1297
NSP	106	Sensor holder	DNK1576
NSP	107	2mm pitch connector assembly (2P)	PDE1189
NSP	108	Synchro shaft	PLA1085
NSP	109	Main chassis	PNA1886
NSP	110	Link plate	PNA1698
NSP	111	Gear angle	PNB1272
NSP	112	2mm pitch connector assembly (2P)	PDE1120
NSP	113	Guide bar	PLA1086
NSP	114	SM select	PNB1305
NSP	115	Eject lever	PNB1277
NSP	116	Plate holder	PNM1138
NSP	117	Top guide	PNW1951
NSP	118	Center guide	PNW1952
NSP	119	Bottom guide	PNW1953
NSP	120	Side guide L	PNW1954
NSP	121	Side guide R	PNW1955
NSP	122	Sub chassis	DNA1055
NSP	123	Hold plate	DNH1294
NSP	124	2mm pitch connector assembly (5P)	PDE1190
NSP	125	Rubber tube	PEB1130
NSP	126	Motor pulley	PLB-283
NSP	127	Upper chassis	PNA1611
NSP	128	Rubber	PEB1192
NSP	129	Motor (DISC SELECT, LOADING, EJECT)	PXM1102
NSP	130	Connector Ass'y (4P)	PDE1191
NSP	131	Spacer	PNM1139

2.3 SERVO MECHANISM ASSEMBLY M

Parts List

Mark	No.	Description	Part No.
	1	Carriage D.C motor assembly	PEA1246
	2	••••••	
	3	Earth spring	PBH1132
	4	Guide bar	PLA1094
	5	Disc table	PNW1067
	6	Gear 1	PNW2052
	7	Gear 2	PNW2053
	8	Gear 3	PNW2054
	9	Pinion gear	PNW2055
	10	PWB holder	PNW2057
	11	Carrige DC motor/0.3W	PXM1027
	12	D.C motor assembly (Spindle, withe oil)	PEA1235
	13	Pickup assembly	PEA1291
	14	Disc table assembly	PEA1035
	15	Screw	BBZ26P060FMC
	16	Screw	BPZ20P060FMC
	17	Screw	BPZ26P100FMC
	18	Screw	JFZ17P025FZK
	19	Screw	JFZ20P040FMC
	20	Washer	WT12D032D025
NSP	101	Mechanism board assembly	PWX1192
NSP	102	Earth lead unit	PDE1074
NSP	103	Clamp magnet	PMF1014
NSP	104	Gear stopper	PNB1303
NSP	105	Yoke M	PNB1312
NSP	106	AV angle	PNB1405
	107	Carrige base	PNW2058

*1: Fix the motors 11 and 12 on the mechanism board assembly 101 so that the label attached on the motor faces the direction illusted.



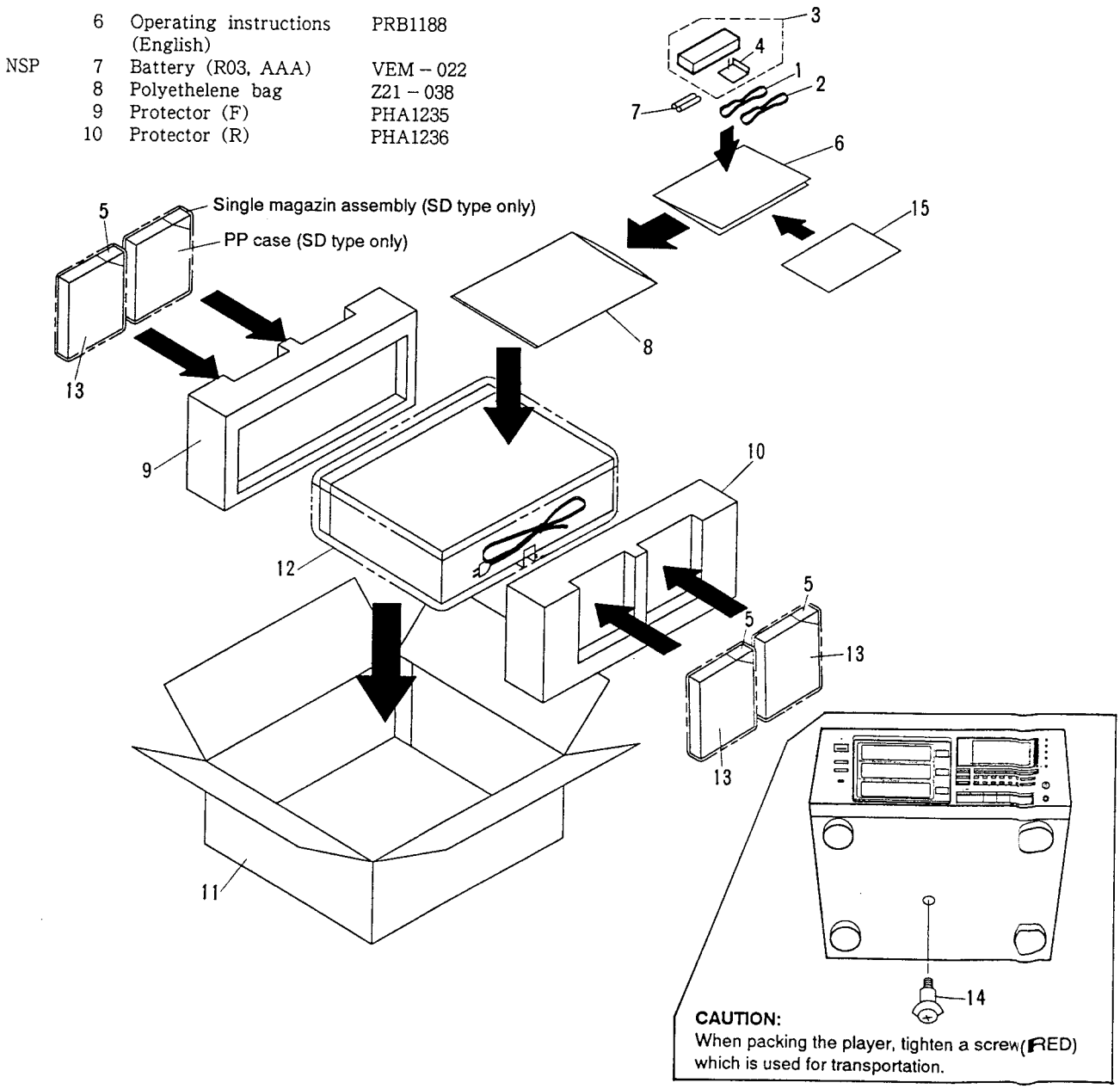
3. PACKING AND PARTS LIST

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List

Mark	No.	Description	Part No.
	1	Connection cord with mini plug	PDE – 319
	2	Connection cord with plug	PDE1001
	3	Rmote control unit	PWW1081
	4	Battery lid	PZN1012
	5	Magazine assembly	PXA1504
	6	Operating instructions (English)	PRB1188
NSP	7	Battery (R03, AAA)	VEM – 022
	8	Polyethelene bag	Z21 – 038
	9	Protector (F)	PHA1235
	10	Protector (R)	PHA1236
	11	Packing case	PHG1883
	12	Sheet	Z23 – 031
	13	PP case	PYY1169
	14	Screw (RED)	PBA1060
NSP	15	Warranty card	ARY1044


Single magazin assembly (SD type only)
PP case (SD type only)
CAUTION:
When packing the player, tighten a screw(RED) which is used for transportation.

4. SCHEMATIC AND PCB CONNECTION DIAGRAMS

Note: (Type 4)

1. **When ordering service parts, be sure to refer to "PARTS LIST of EXPLODED VIEWS" or "PCB PARTS LIST".**
2. **Since these are basic circuits, some parts of them or the values of some components may be changed for improvement.**
3. **RESISTORS:**
   Unit: k:kΩ, M:MΩ, or Ω unless otherwise noted.
   Rated power: 1/4W, 1/6W, 1/8W, 1/10W unless otherwise noted.
   Tolerance: (F): ±1%, (G): ±2%, (K): ±10%, (M): ±20% or ±5% unless otherwise noted.
4. **CAPACITORS:**
   Unit: p:pF or μF unless otherwise noted.
   Ratings: capacitor (μF)/ voltage (V) unless otherwise noted.
   Rated voltage: 50V except for electrolytic capacitors.
5. **COILS:**
   Unit: m:mH or μH unless otherwise noted.
6. **VOLTAGE AND CURRENT:**
   ▭ : DC voltage (V) in PLAY mode unless otherwise noted.
   ⇦ mA or ← mA: DC current in PLAY mode unless otherwise noted.
   Value in ( ) is DC current in STOP mode.
7. **OTHERS:**
   - ➡ : Signal route.
   - ⊘ : Adjusting point.
   - ▼ (Red) : Measurement point.
   - The ⚠ mark found on some component parts indicates the importance of the safety factor of the parts. Therefore, when replacing, be sure to use parts of identical designation.
8. **SWITCHES** (Underline indicates switch position):

DISPLAY BOARD ASSEMBLY

S701	: ADLC	S722	: 1
S702	: REP	S723	: JAZZ
S703	: TIME	S724	: ▶
S704	: EDIT	S725	: D1
S705	: D6	S726	: 6
S706	: 5	S727	: FLAT
S707	: PGM	S728	: EJECT 3
S708	: ▶▶	S729	: M1
S709	: D5	S730	: 7
S710	: 4	S731	: DANCE
S711	: + 10	S732	: EJECT 2
S712	: ◀◀	S733	: M2
S713	: D4	S734	: 8
S714	: 3	S735	: CHURCH
S715	: DEL	S736	: EJECT 1
S716	: ■	S737	: M3
S717	: D3	S738	: 9
S718	: 2	S739	: HALL
S719	: ≧20	S741	: FADER
S720	: ❚❚	S742	: 10
S721	: D2	S743	: STADIUM

POWER SW BOARD ASSEMBLY

S801	: SCAN
S802	: RANDOM
S803	: POWER
S804	: TIMER

9. **For SCH-□ on the schematic diagram :**
   - SCH-□ indicates the drawing number of the schematic diagram. (SCH stands for schematic diagram.)

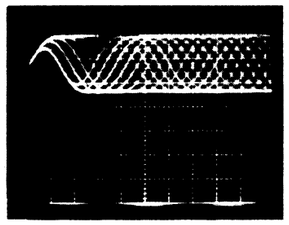
Waveforms

Note: The encircled numbers denote measuring points in the schematic diagram.

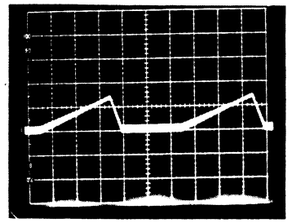
*1 50T-JUMP: After switching to the pause mode, press the manual search key.

*2 FOCUS-IN: Press the key without loading a disc.

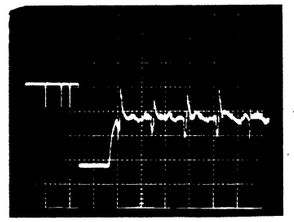
② TP1-Pin 3: PLAY MODE
(RF)
500mV/div 500nsec/div



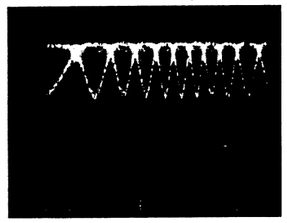
⑤ IC201-Pin 1:FOCUS-IN (*2) MODE
(FODR)
1V/div 200ns/div



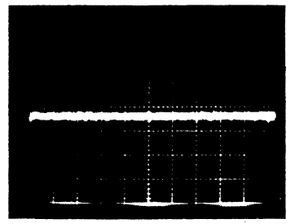
⑦ IC202-Pin 3:TRACK SEARCH MODE
(SPDR)
2V/div 50msec/div



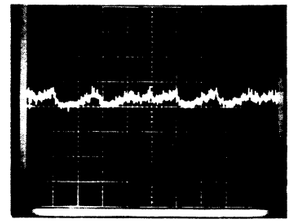
② TP1-Pin 3:TRACK SEARCH MODE
(RF)
500mV/div 200μsec/div



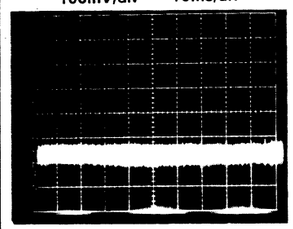
⑤ IC201-Pin 1:PLAY MODE
(FODR)
1V/div 1msec/div



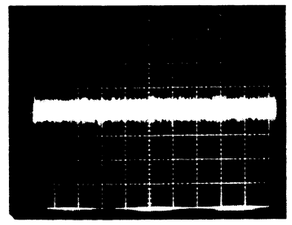
⑧ IC202-Pin 4:PLAY MODE
(CADR)
500mV/div 5sec/div



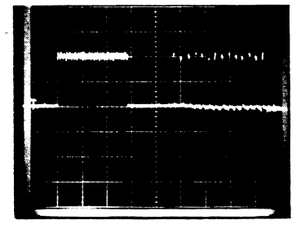
③ FE Side of R331:PLAY MODE
(FOER)
100mV/div 10ms/div



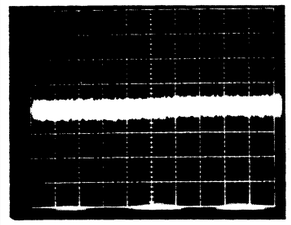
⑥ IC201-Pin 3:PLAY MODE
(TRDR)
500mV/div 1ms/div



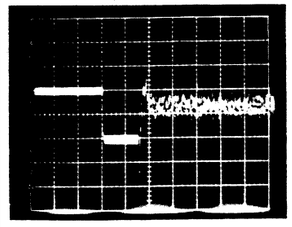
⑧ IC202-Pin 4:TRACK SEARCH MODE
(CADR)
2V/div 200msec/div



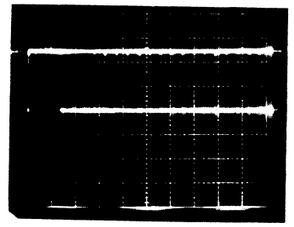
④ TP1-Pin 2: PLAY MODE
(TRER)
1V/div 10ms/div



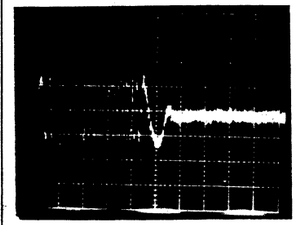
⑥ IC201-Pin 3: 50T-JUMP (*1) MODE
(TRDR)
500mV/div 1ms/div



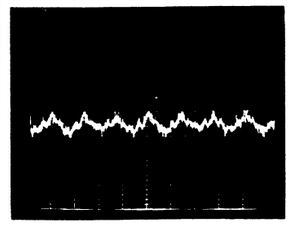
⑨ IC301-Pin 39:PLAY MODE
(EFM)
2V/div 500ns/div



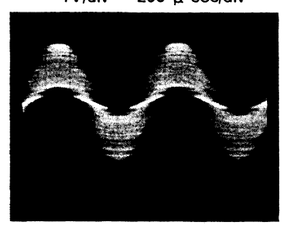
④ TP1-Pin 2: 50T-JUMP (*1) MODE
(TRER)
1V/div 1msec/div



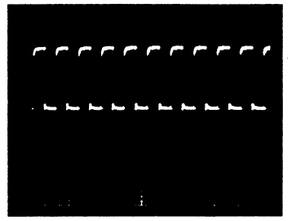
⑦ IC202-Pin 3:PLAY MODE
(SPDR)
1V/div 50msec/div



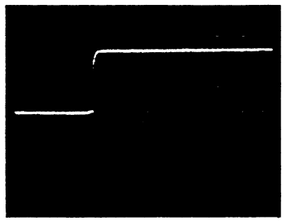
⑩ IC401-Pin 9:PLAY MODE (1kHz)
(LRCO) (D/A DATA OUT)
1V/div 200 μ sec/div



⑯ IC301-Pin 47:PLAY MODE(1kHz)
(BCLK)
2V/div 500nsec/div



㉒ IC20-Pin 4:POWER SWITCH-ON
(RST)
2V/div 100msec/div



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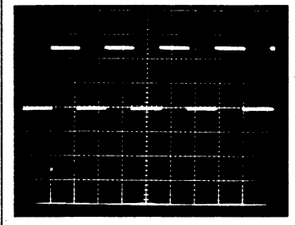
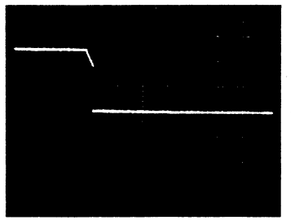
⑱ IC301-Pin 45:PLAY MODE(1kHz)
(LRCK)
2V/div 10μsec/div



㉒ IC20-Pin 4:POWER SWITCH-OFF
(RST)
2V/div 100msec/div



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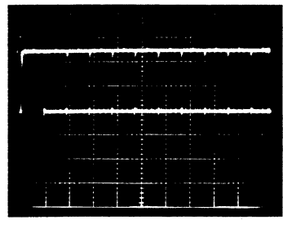
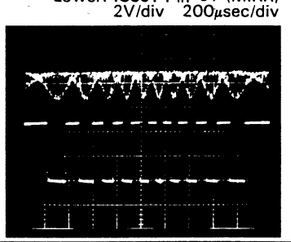
⑲ IC301-Pin 46:PLAY MODE(1kHz)
(DATA)
2V/div 500nsec/div



㉓ : TRACK SEARCH MODE
Upper: TP1-Pin 3 (RF) 1V/div
Lower: IC301-Pin 91 (MIRR)
2V/div 200μsec/div



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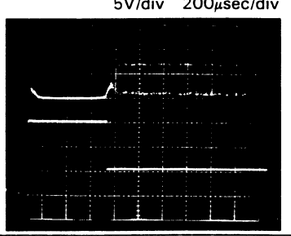
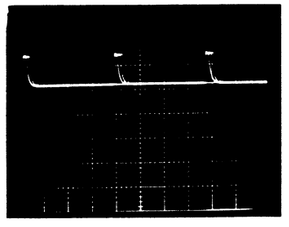
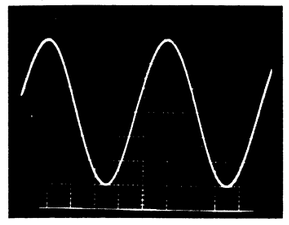
㉔ : PLAY MODE
Upper: TP1-Pin 3 (RF) 1V/div
Lower: IC301-Pin 92 (DFCT)
5V/div 200μsec/div



㉝ IC301-Pin 96:PLAY MODE
(MDP)
2V/div 2μsec/div



㉑ Pin -OUTPUT: PLAY MODE (1kHz)
1V/div 200μsec/div



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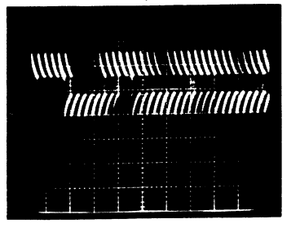
㊸ IC301-Pin 33:PLAY MODE
(PCO)
2V/div 10μsec/div



IC401
PD2026B

Pin No.	
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Note :

IC351
PD3241A

Pin No.	
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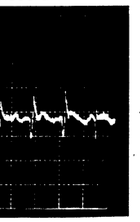
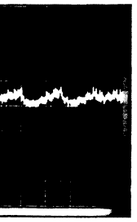
the pause mode, press the

out loading a disc.

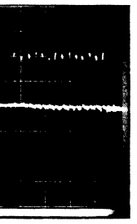
TRACK SEARCH MODE
nsec/div



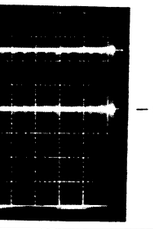
PLAY MODE
5sec/div



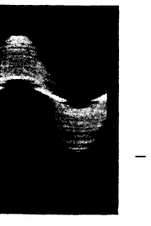
TRACK SEARCH MODE
0msec/div



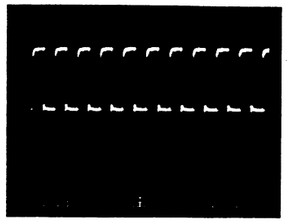
:PLAY MODE
ns/div



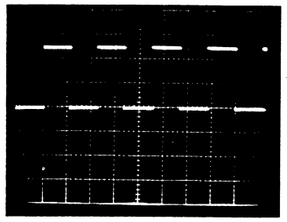
PLAY MODE (1kHz)
TA OUT)
0 μ sec/div



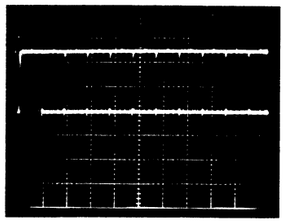
⑯ IC301-Pin 47:PLAY MODE(1kHz)
(BCLK)
2V/div 500nsec/div



⑱ IC301-Pin 45:PLAY MODE(1kHz)
(LRCK)
2V/div 10μsec/div



⑲ IC301-Pin 46:PLAY MODE(1kHz)
(DATA)
2V/div 500nsec/div



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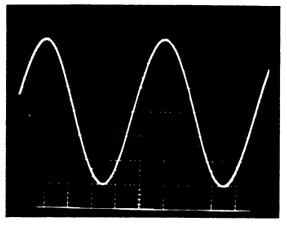
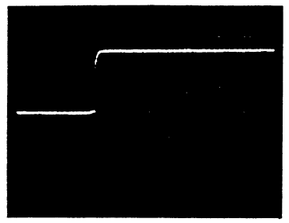
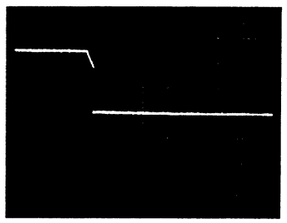
㉑ Pin -OUTPUT: PLAY MODE (1kHz)
1V/div 200μsec/div



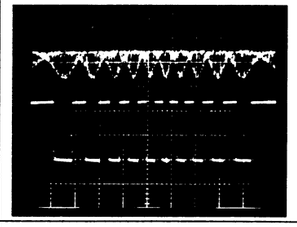
㉒ IC20-Pin 4:POWER SWITCH-ON
(RST)
2V/div 100msec/div



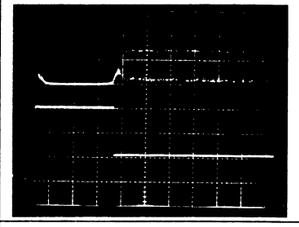
㉒ IC20-Pin 4:POWER SWITCH-OFF
(RST)
2V/div 100msec/div



㉓ : TRACK SEARCH MODE
Upper: TP1-Pin 3 (RF) 1V/div
Lower: IC301-Pin 91 (MIRR)
2V/div 200μsec/div



㉔ : PLAY MODE
Upper: TP1-Pin 3 (RF) 1V/div
Lower: IC301-Pin 92 (DFCT)
5V/div 200μsec/div



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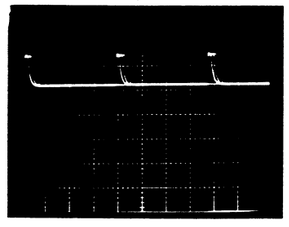
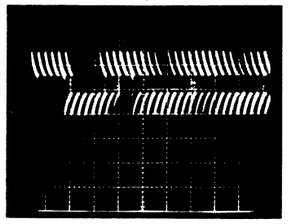
㉝ IC301-Pin 96:PLAY MODE
(MDP)
2V/div 2μsec/div



㊸ IC301-Pin 33:PLAY MODE
(PCO)
2V/div 10μsec/div



IC401
PD2026B

Pin No.	Voltage (V)
1	0
2	0
3	5.0
4	5.0
5	2.4
6	2.6
7	0
8	0
9	2.6
10	2.4
11	5.0
12	0
13	2.4
14	2.4
15	5.0
16	0
17	5.0
18	0
19	2.5
20	5.0
21	4.7 to 5.0
22	4.7 to 5.0
23	5.0
24	5.0
25	2.5
26	2.5
27	2.5
28	5.0

IC552 GGC1016
(TC51832ASPL-10)

Pin No.	Voltage (V)
1	2.5
2	2.5
3	2.5
4	2.5
5	2.5
6	2.5
7	2.5
8	2.5
9	2.5
10	2.5
11	0.1
12	0.1
13	0.1
14	0
15	0.1
16	0.1
17	0.1
18	0.1
19	0.1
20	1.9
21	2.5
22	5.0
23	2.5
24	2.5
25	2.5
26	2.5
27	2.1
28	5.0

IC202
LA6520

Pin No.	Voltage (V)
1	1.8
2	1.8
3	–0.7
4	0 to 0.4
5	0 to 0.2
6	0 to 0.2
7	2.0
8	2.0
9	0
10	0
11	0
12	9.2
13FIN	–9.8
14	–
15	–
16	–

IC301
CXD2515Q

Pin No.	Voltage (V)	Pin No.	Voltage (V)	Pin No.	Voltage (V)	Pin No.	Voltage (V)
1	0.1 to 0.5	26	3.4	51	0	76	5.0
2	0	27	2.5	52	5.0	77	4.7 to 5.0
3	0	28	2.5	53	2.5	78	4.7 to 5.0
4	0	29	2.5	54	5.0	79	0
5	0.3	30	2.5	55	2.5	80	4.7 to 5.0
6	0	31	2.5	56	0	81	5.0
7	0.3	32	2.5	57	5.0	82	5.0
8	0	33	2.5	58	0	83	5.0
9	0.2	34	2.5	59	0	84	0
10	0.3	35	0	60	0	85	0
11	0.6	36	2.5	61	0	86	4.7 to 5.0
12	5.0	37	0.9	62	2.5	87	4.7 to 5.0
13	0	38	2.5	63	2.5	88	4.7 to 5.0
14	0	39	2.5	64	0	89	0
15	0	40	5.0	65	0	90	5.0
16	0	41	5.0	66	2.7	91	0
17	0	42	5.0	67	2.7	92	0
18	0	43	0	68	2.5	93	5.0
19	5.0	44	2.5	69	2.5	94	0
20	0	45	2.5	70	5.0	95	5.0
21	5.0	46	2.5	71	2.5	96	2.5
22	5.0	47	2.5	72	0	97	0
23	0	48	2.5	73	2.5	98	5.0
24	2.5	49	2.2	74	0	99	5.0
25	2.5	50	2.5	75	0	100	0 to 0.4

Note : For details of the logic of the signals related to the mechanism, refer to 8. IC information.

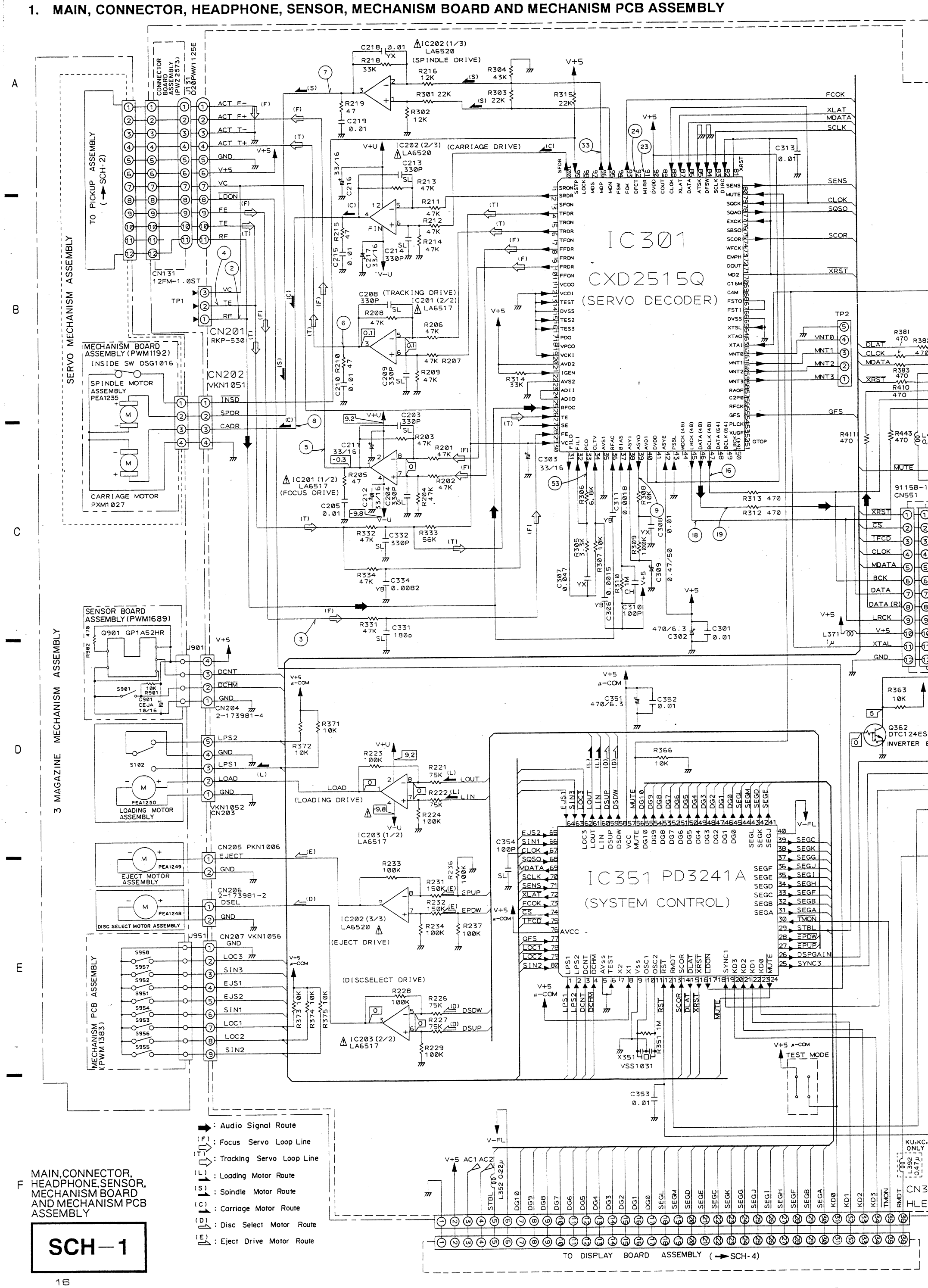
IC351
PD3241A

Pin No.	Voltage (V)	Pin No.	Voltage (V)	Pin No.	Voltage (V)	Pin No.	Voltage (V)
1	5.0	21	0	41	–26 to –5	61	0
2	0	22	0	42	–26 to –5	62	5.0
3	5.0	23	0	43	–26 to –5	63	5.0
4	5.0	24	5.0	44	–26 to –5	64	0
5	0	25	5.0	45	–24	65	0
6	0	26	–9.8	46	–24	66	0
7	0	27	5.0	47	–24	67	4.7 to 5.0
8	5.0	28	5.0	48	–24	68	4.7 to 5.0
9	0	29	0	49	–24	69	4.7 to 5.0
10	2.4	30	0	50	–24	70	5.0
11	2.4	31	–26 to –5	51	–24	71	4.7 to 5.0
12	5.0	32	–26 to –5	52	–24	72	4.7 to 5.0
13	5.0	33	–26 to –5	53	–24	73	5.0
14	0	34	–21	54	–24	74	5.0
15	5.0	35	–26 to –5	55	–24	75	5.0
16	5.0	36	–26 to –5	56	0	76	5.0
17	0	37	–26 to –5	57	5.0	77	5.0
18	0	38	–26 to –5	58	0	78	0
19	5.0	39	–5 to –0	59	0	79	5.0
20	0	40	–26	60	0	80	5.0

IC551
TC9331F

Pin No.	Voltage (V)	Pin No.	Voltage (V)	Pin No.	Voltage (V)	Pin No.	Voltage (V)
1	0	21	0	41	0	61	1.9
2	2.5	22	0	42	0.1	62	2.1
3	2.5	23	5.0	43	0.1	63	5.0
4	5.0	24	2.0 to 3.1	44	0.1	64	2.1
5	2.5	25	2.5	45	0.1	65	5.0
6	5.0	26	2.5	46	0.1	66	5.0
7	5.0	27	2.5	47	0.1	67	5.0
8	2.5	28	2.5	48	0.1	68	5.0
9	5.0	29	2.5	49	0.1	69	5.0
10	2.5	30	2.5	50	5.0	70	4.7 to 5.0
11	5.0	31	2.5	51	0	71	4.7 to 5.0
12	5.0	32	0	52	0.1	72	5.0
13	0	33	2.5	53	0.1	73	5.0
14	5.0	34	2.5	54	0.1	74	5.0
15	2.5	35	2.5	55	0.1	75	5.0
16	5.0	36	2.5	56	0.1	76	5.0
17	2.2	37	2.5	57	0.1	77	5.0
18	2.5	38	2.5	58	0.1	78	2.5
19	0	39	2.5	59	0.1	79	2.5
20	2.5	40	2.5	60	0	80	0

1. MAIN, CONNECTOR, HEADPHONE, SENSOR, MECHANISM BOARD AND MECHANISM PCB ASSEMBLY



3 MAGAZINE MECHANISM ASSEMBLY

F MAIN, CONNECTOR, HEADPHONE, SENSOR, MECHANISM BOARD AND MECHANISM PCB ASSEMBLY

SCH−1

PCB ASSEMBLY

MOTHER BOARD ASSEMBLY
(PWM1779 : KU , KC)
(PWM1780 : HEM)
(PWM1781 : SD)

MAIN BOARD ASSEMBLY
(PWM2569 : KU , KC)
(PWM2570 : HEM)
(PWM2571 : SD)

C301
D2515Q
I/O DECODER)

IC351 PD3241A
SYSTEM CONTROL)

IC401 PD2026B [DAC]

IC405 : LOW PASS FILTER

IC481(1/2), Q482, Q484 : GAIN CONTROLLER

ZERO DETECTING ATTENUATOR DRIVER

MUTE DRIVER

SYSTEM RESET & +5V REGULATOR

TO DSP BOARD ASSEMBLY (→ SCH-3)

BOARD ASSEMBLY (→ SCH-4)

DECK SYNCHRO JACK

HEM ONLY

KU, KC ONLY

KU, KC, SD ONLY

SD ON

HEAD

Line Vol

Line vol
1. Disco
2. Remov
3. Chang

Voltag
220V-2
230V-2

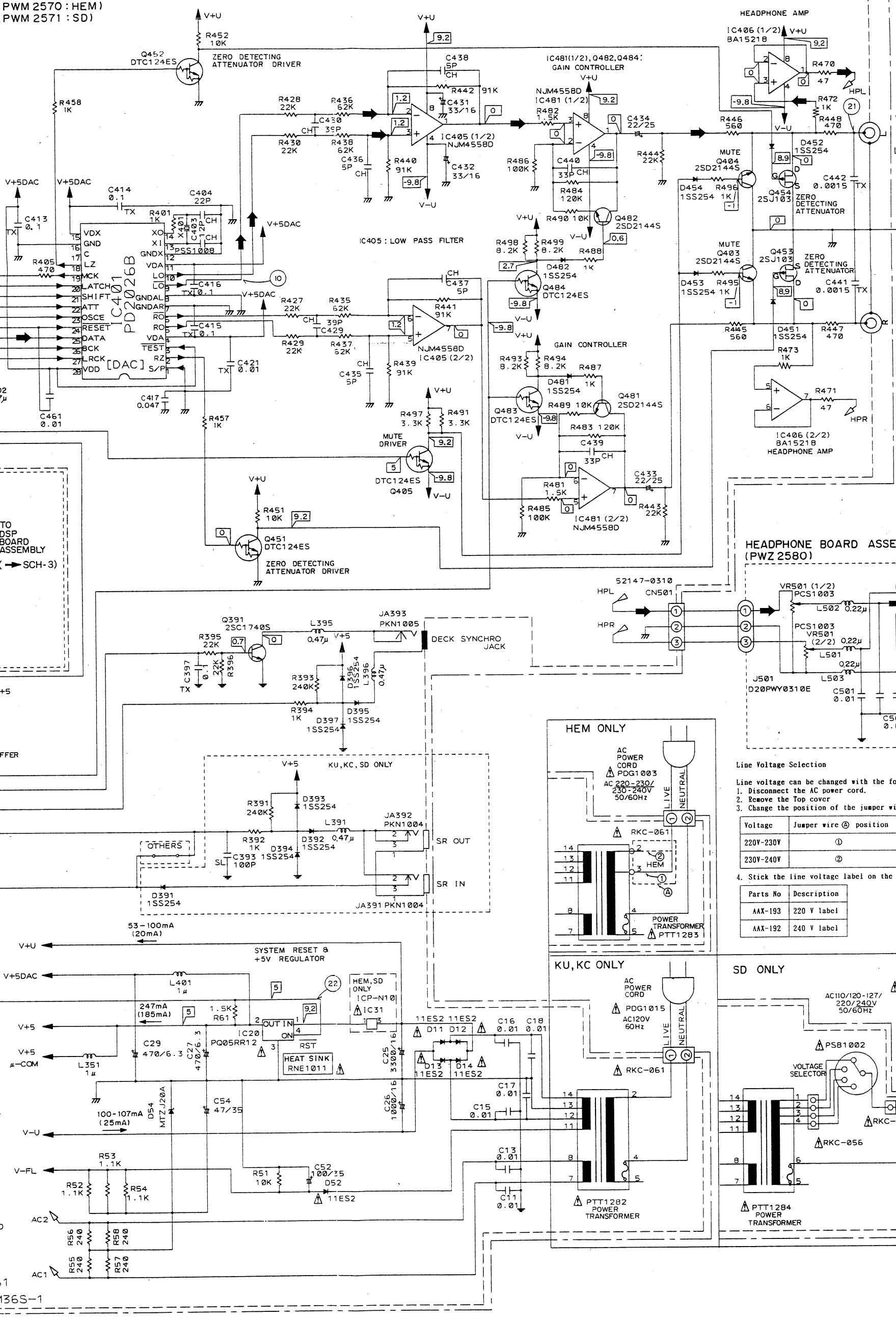
4. Stick

Parts
AAX-
AAX-

MOTHER BOARD ASSEMBLY
(PWM1779 : KU , KC)
(PWM1780 : HEM)
(PWM1781 : SD)

SCH-1

MAIN BOARD ASSEMBLY
PWM2569 : KU,KC)
PWM2570 : HEM)
PWM2571 : SD)



MAIN,CONNECTOR, HEADPHONE,SENSOR, MECHANISM BOARD AND MECHANISM PCB ASSEMBLY

SCH-1

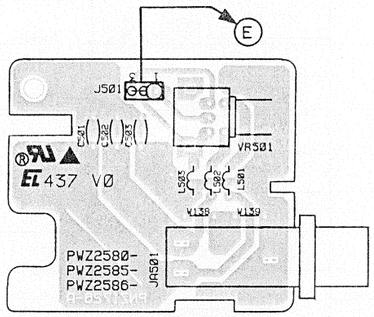
• View from component side

A

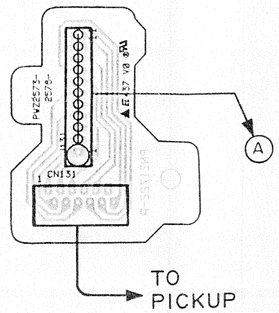
B

C

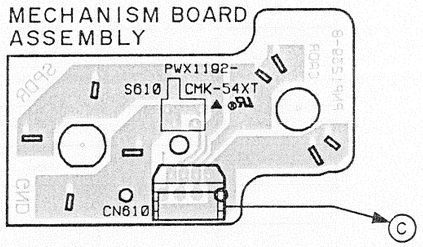
D



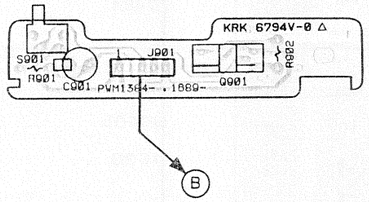
HEADPHONE BOARD ASSEMBLY



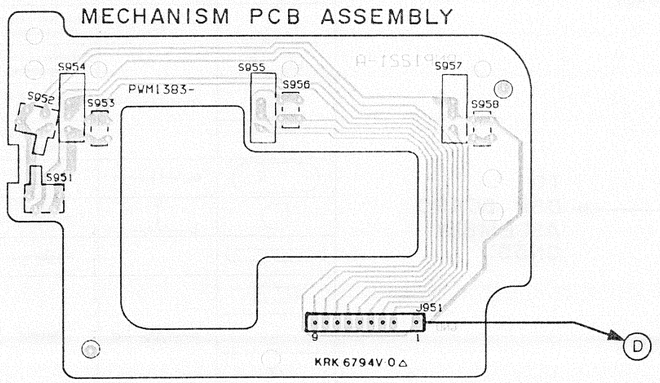
CONNECTOR BOARD ASSEMBLY



MECHANISM BOARD ASSEMBLY

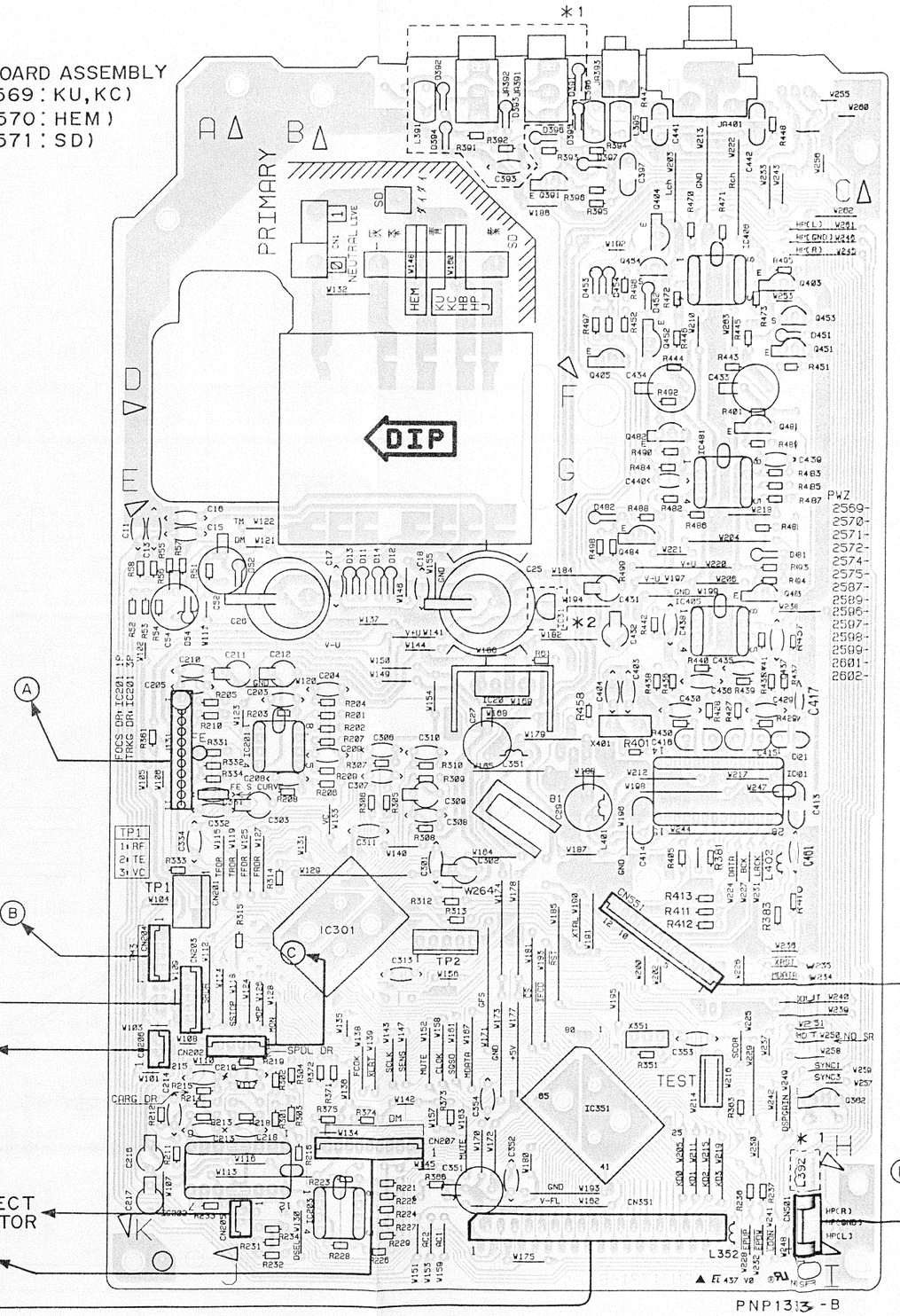


SENSOR BOARD ASSEMBLY

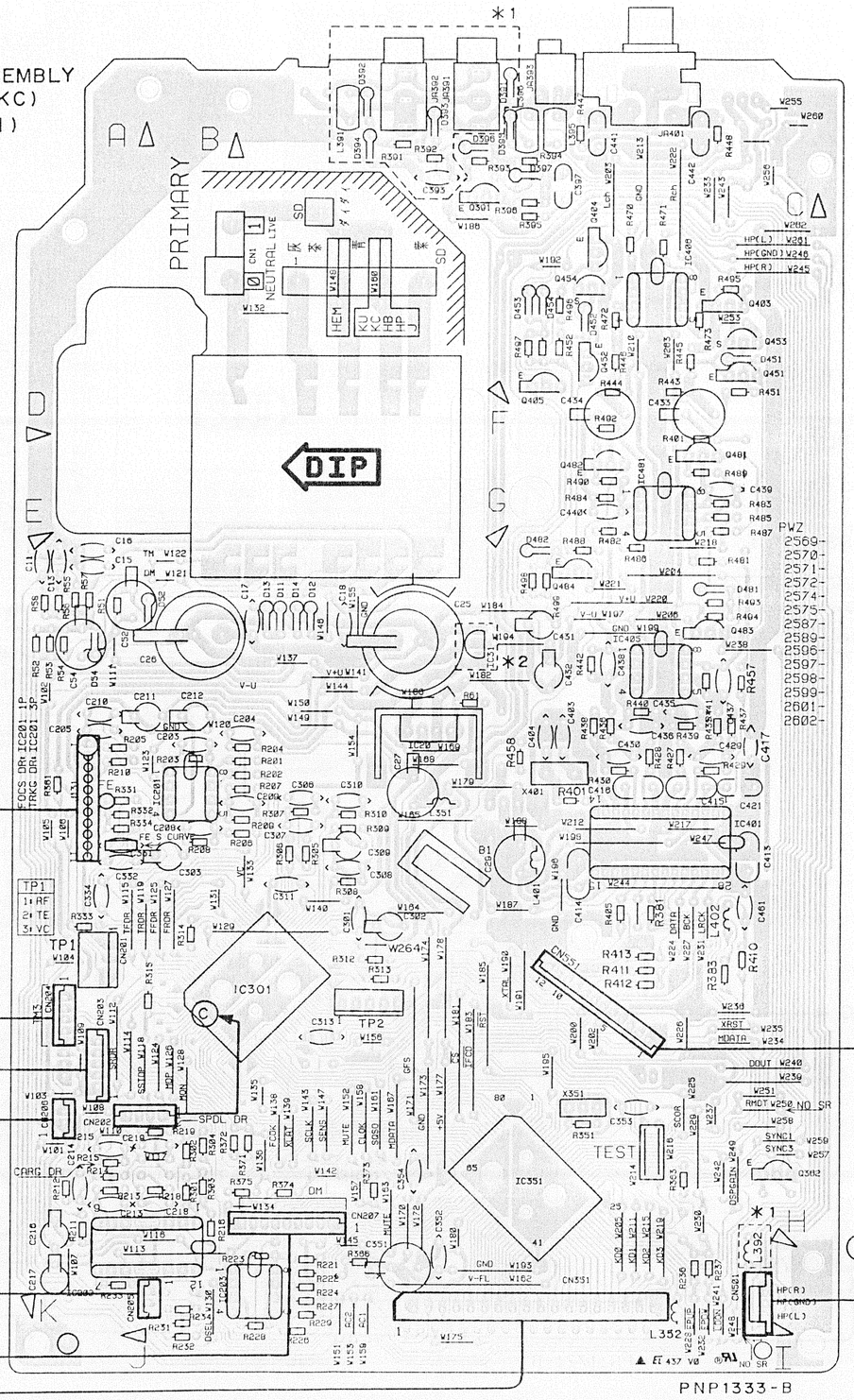


NOTE:
*1: KU, KC, SD ONLY
*2: HEM, SD ONLY

MAIN BOARD ASSEMBLY
(PWZ2569 : KU, KC)
(PWZ2570 : HEM)
(PWZ2571 : SD)



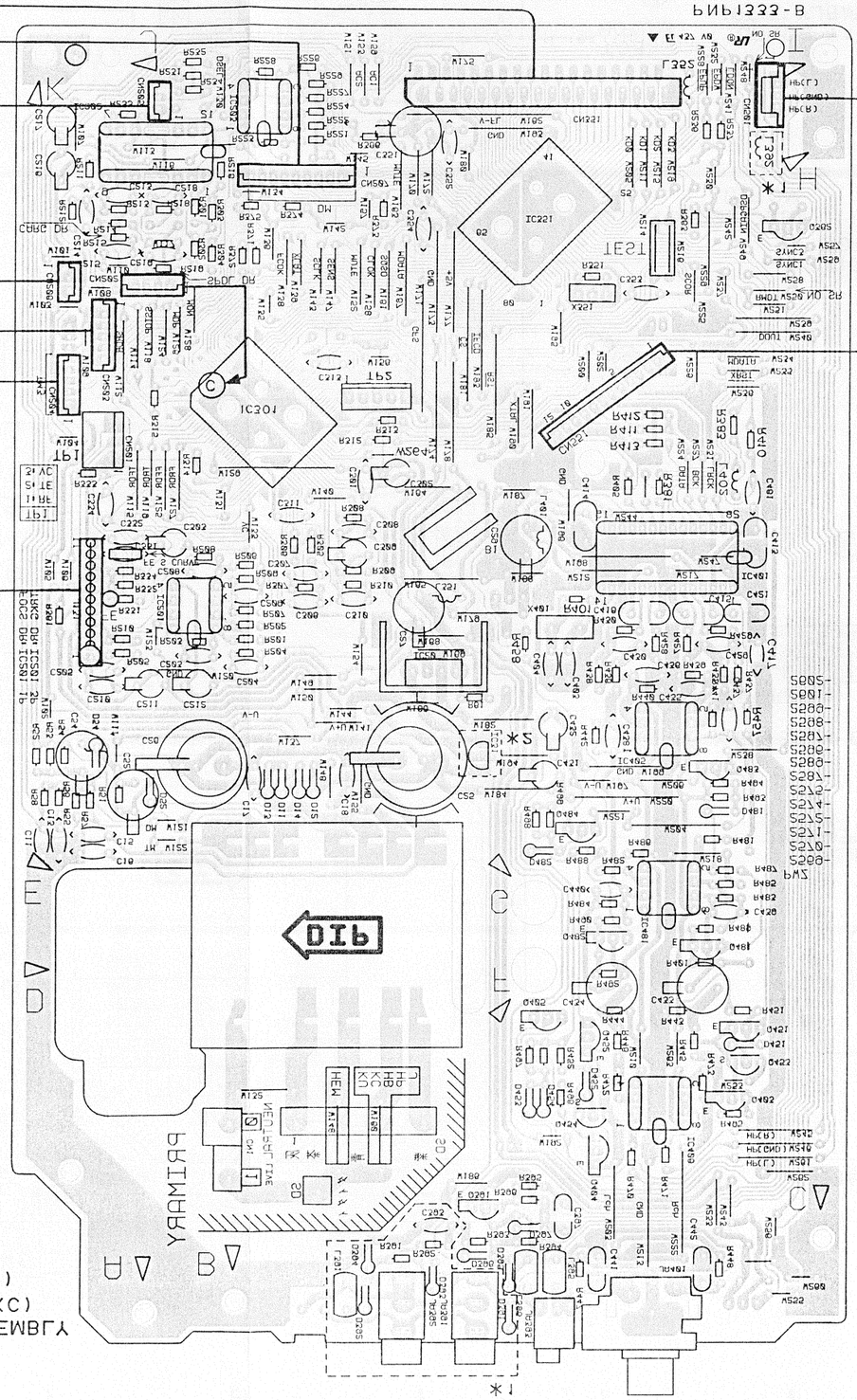
MAIN BOARD ASSEMBLY
(PWZ2569 : KU, KC)
(PWZ2570 : HEM)
(PWZ2571 : SD)



PCB-1

P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor
		FET
		Diode
		Zenner dinde
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		Styrol capacitor
		Electrolytic capacitor (Non-polarized)
		Electrolytic capacitor (Noiseless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.


MAIN BOARD ASSEMBLY
(PWS2571 : SD)
(PWS2570 : HEM)
(PWS2569 : KU,KC)
TO MOTOR DISC SELECT
TO MOTOR LOADING
TO DISPLAY BOARD ASSEMBLY
TO MOTOR ELECT
CN221 ASSEMBLY DSP BOARD TO
IC301
IC501
IC502
IC221
IC401
IC402
IC481
IC484
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IC1000

(PWZ5297 : SD)
(PWZ5270 : HEM)
(PWZ5268 : KU,KC)
MAIN BOARD ASSEMBLY

ASSEMBLY
CONNECTOR BOARD

ASSEMBLY
HEADPHONE BOARD

ASSEMBLY
MECHANISM BOARD

SENSOR BOARD ASSEMBLY

*1 : KU,KC,SD ONLY
*2 : HEM,SD ONLY
NOTE :

MOTOR
LOADING
TO

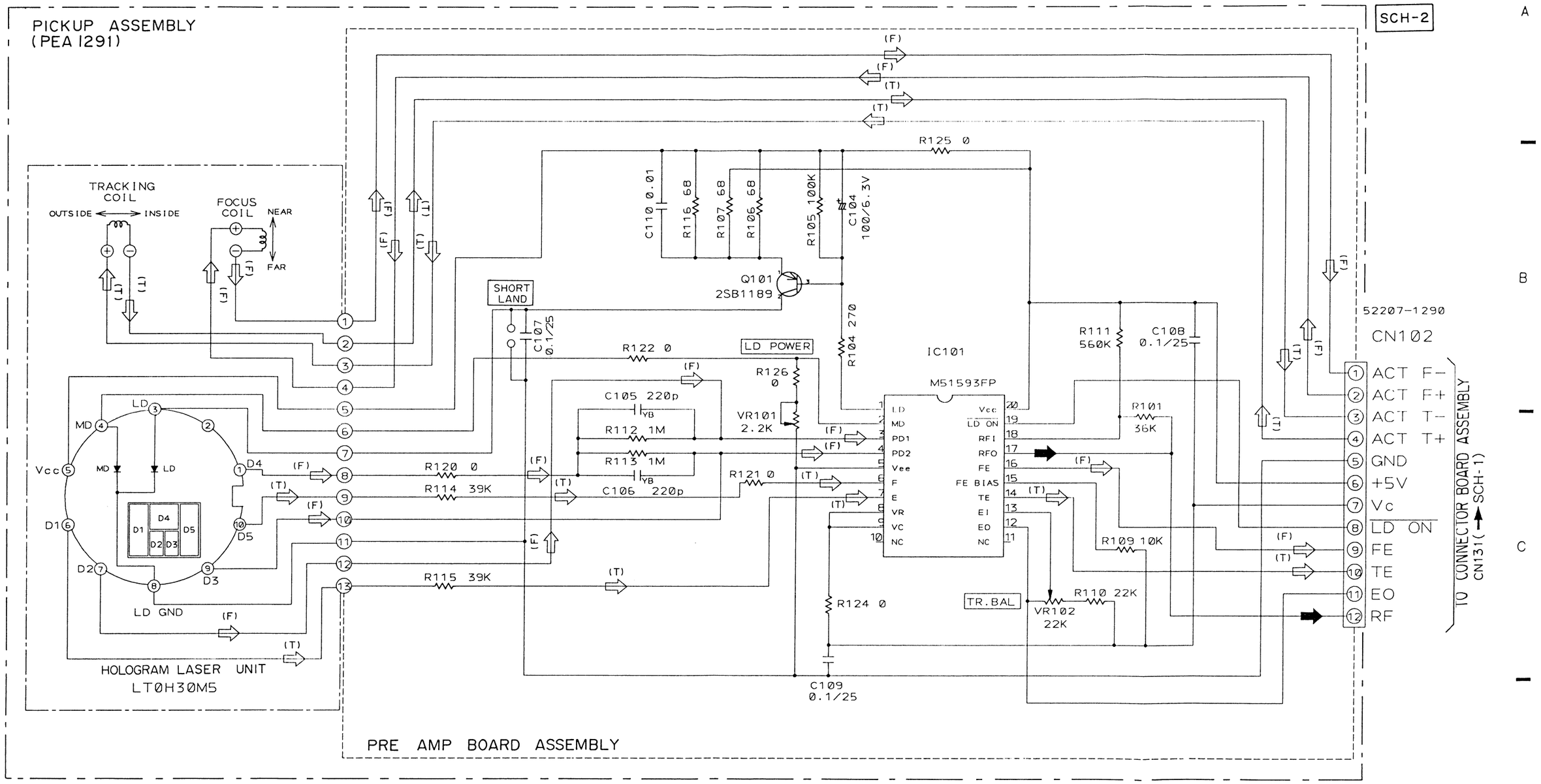
MOTOR
DISC SELECT
TO

MOTOR
ELECT
TO

ASSEMBLY
DISPLAY BOARD
TO

• View from soldering side

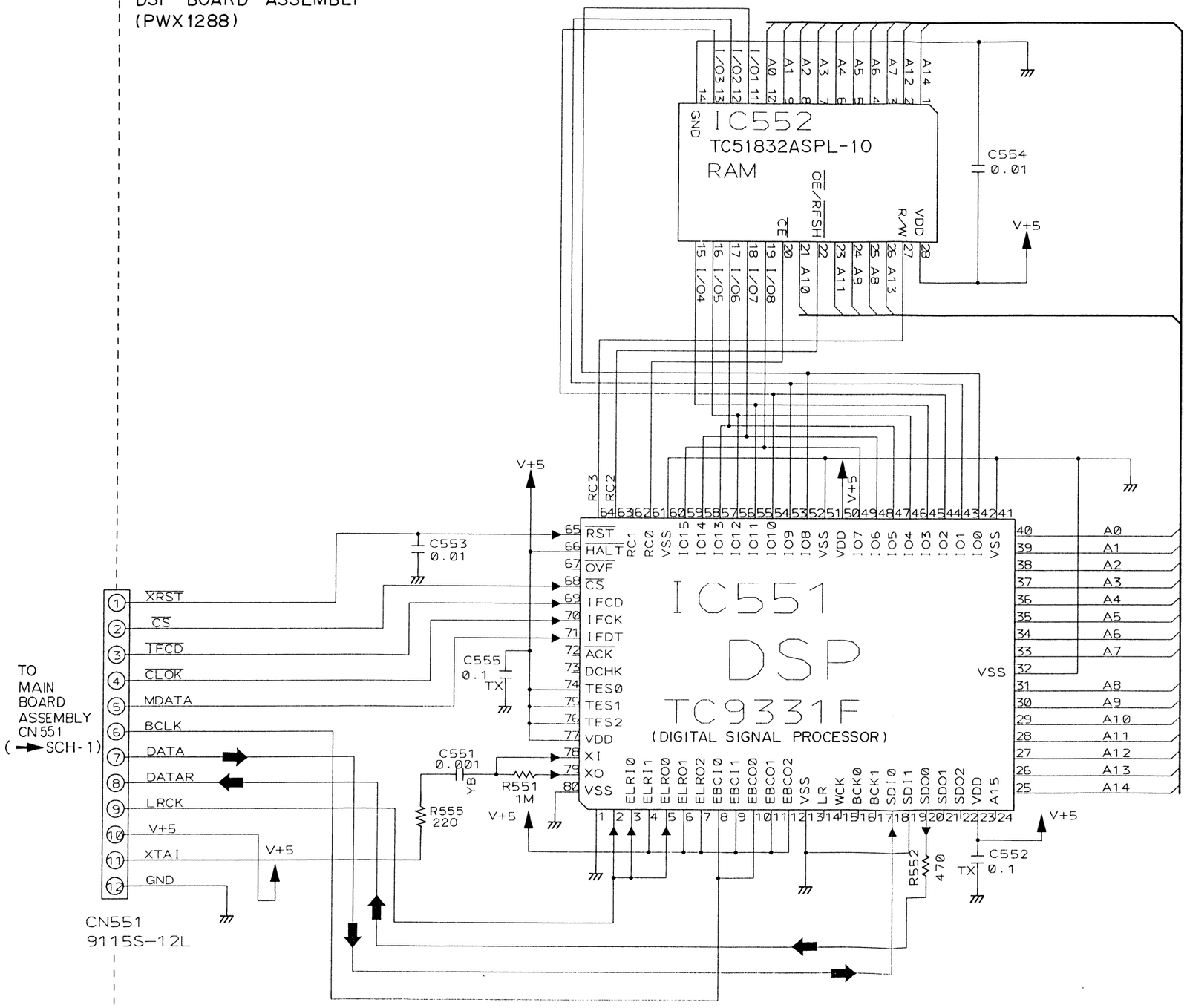
2. PICKUP ASSEMBLY



Note : Component parts are not principally supplied and the diagram is basic and may be changed.

3. DSP BOARD ASSEMBLY

DSP BOARD ASSEMBLY
(PWX1288)

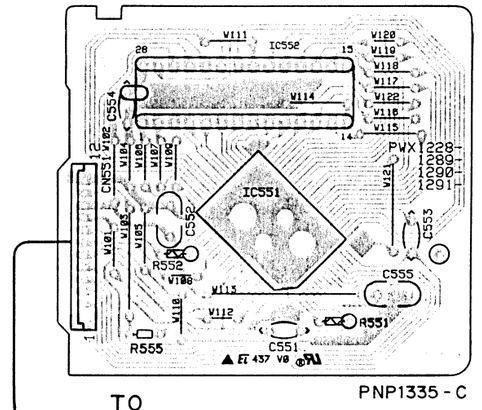


SCH-3

- View from component side

PCB-2

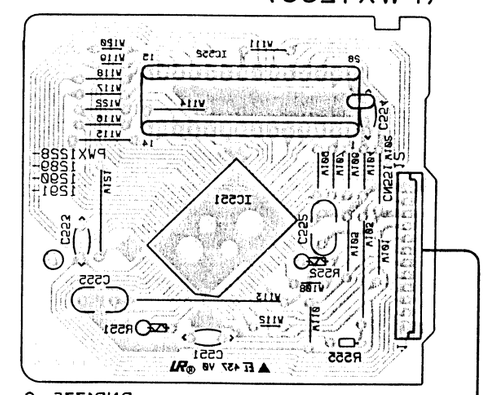
DSP BOARD ASSEMBLY
(PWX1288)



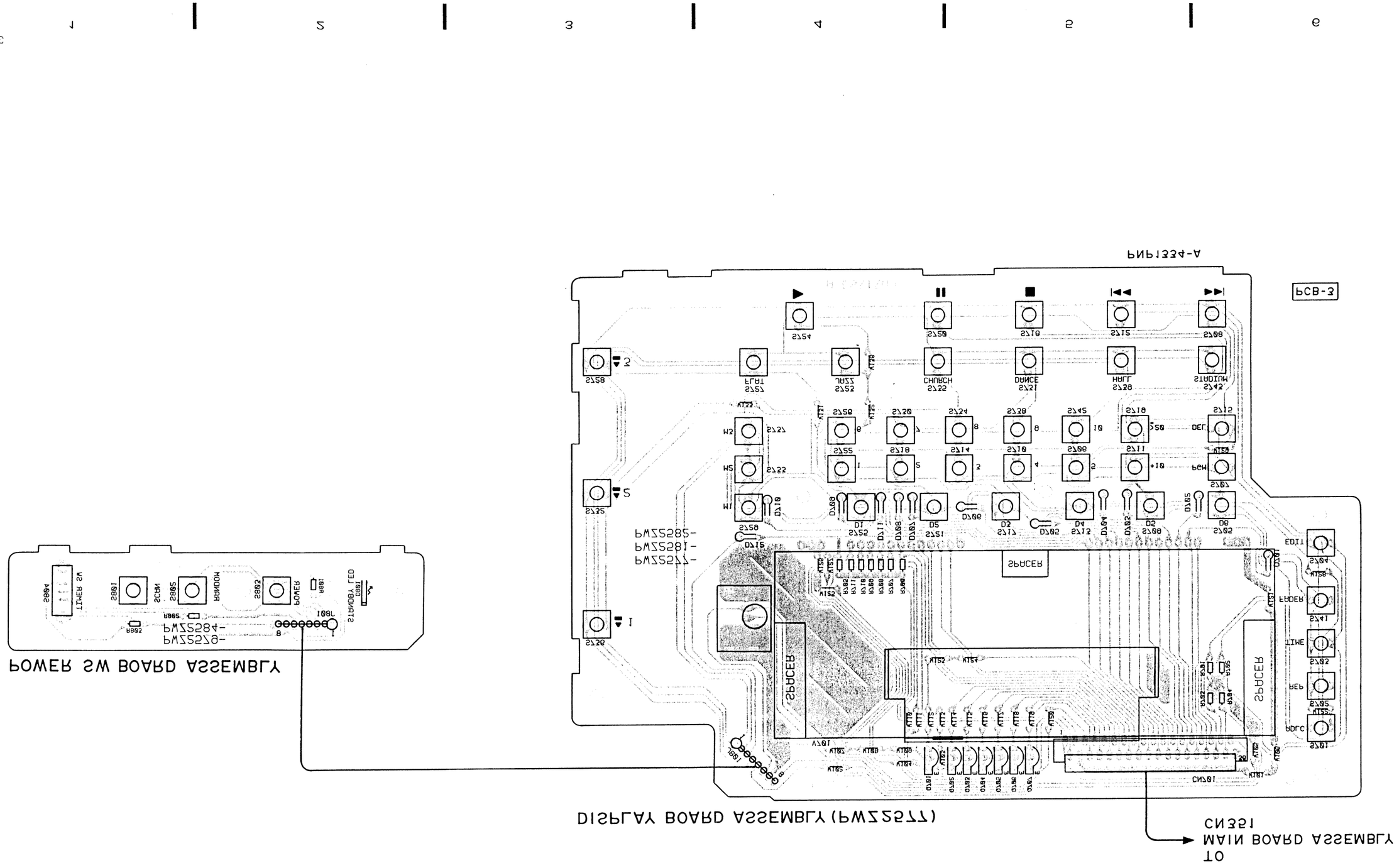
TO
MAIN BOARD ASSEMBLY
CN551

- View from soldering side

PCB-2



TO
MAIN BOARD ASSEMBLY
CN551

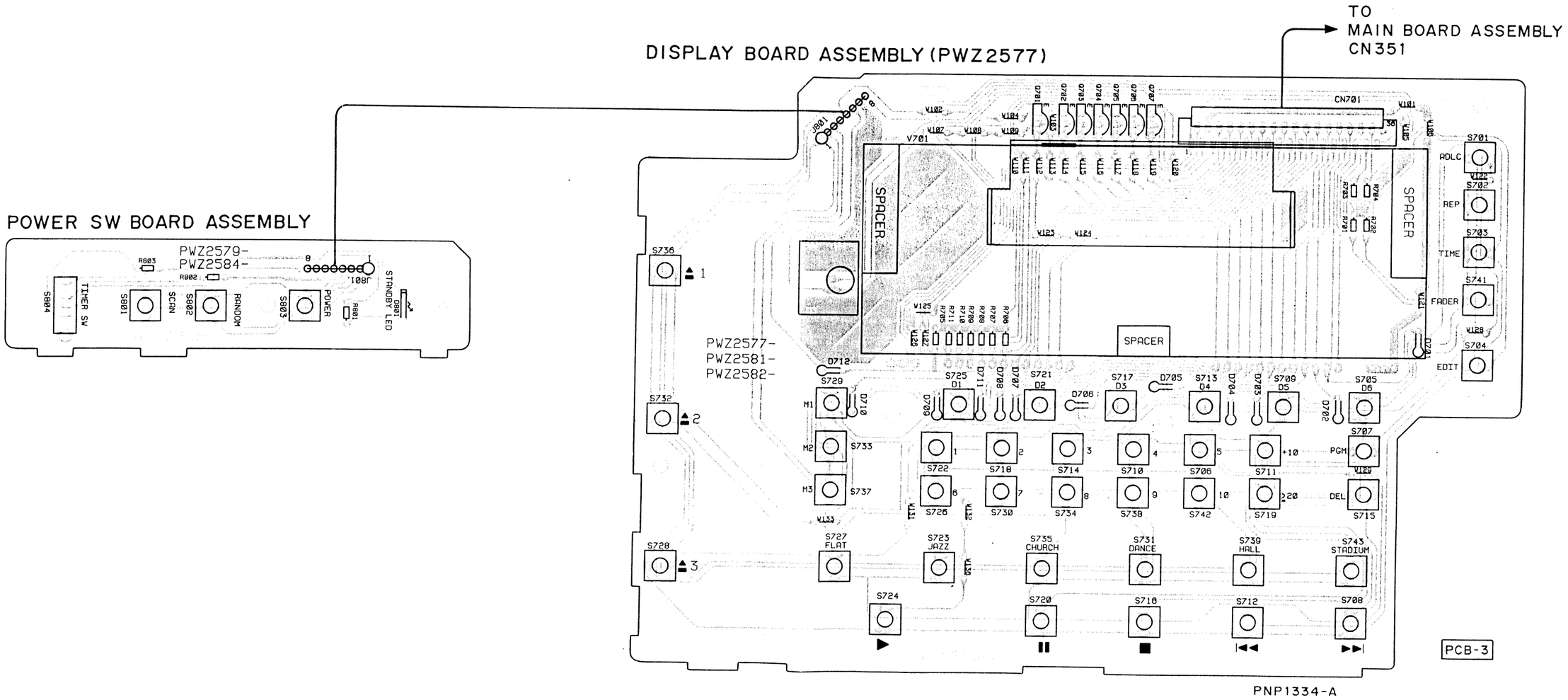


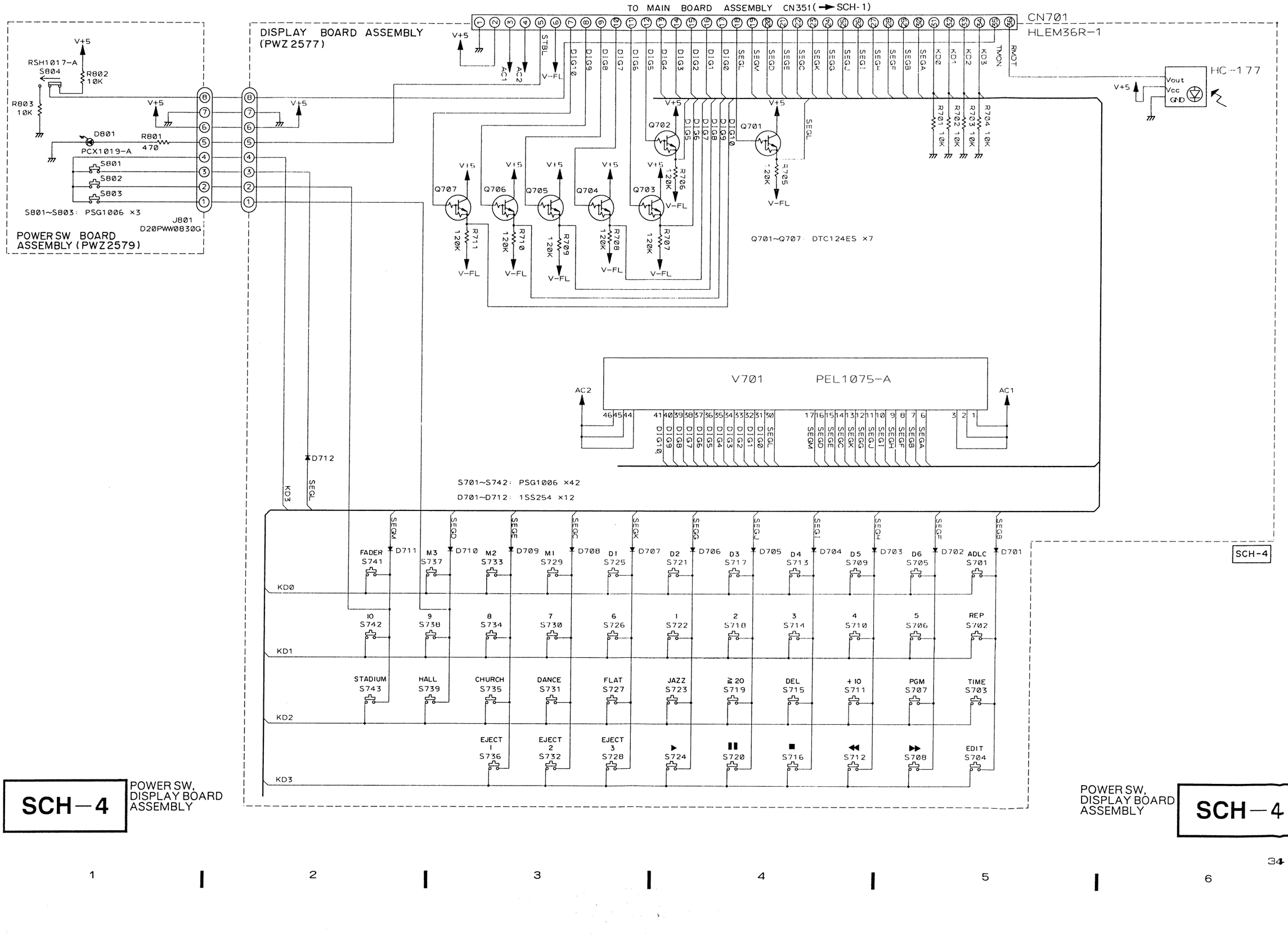
• View from soldering side

4. POWER SW AND DISPLAY BOARD ASSEMBLY

4. POWER SW AND DISPLAY BOARD ASSEMBLY

• View from component side

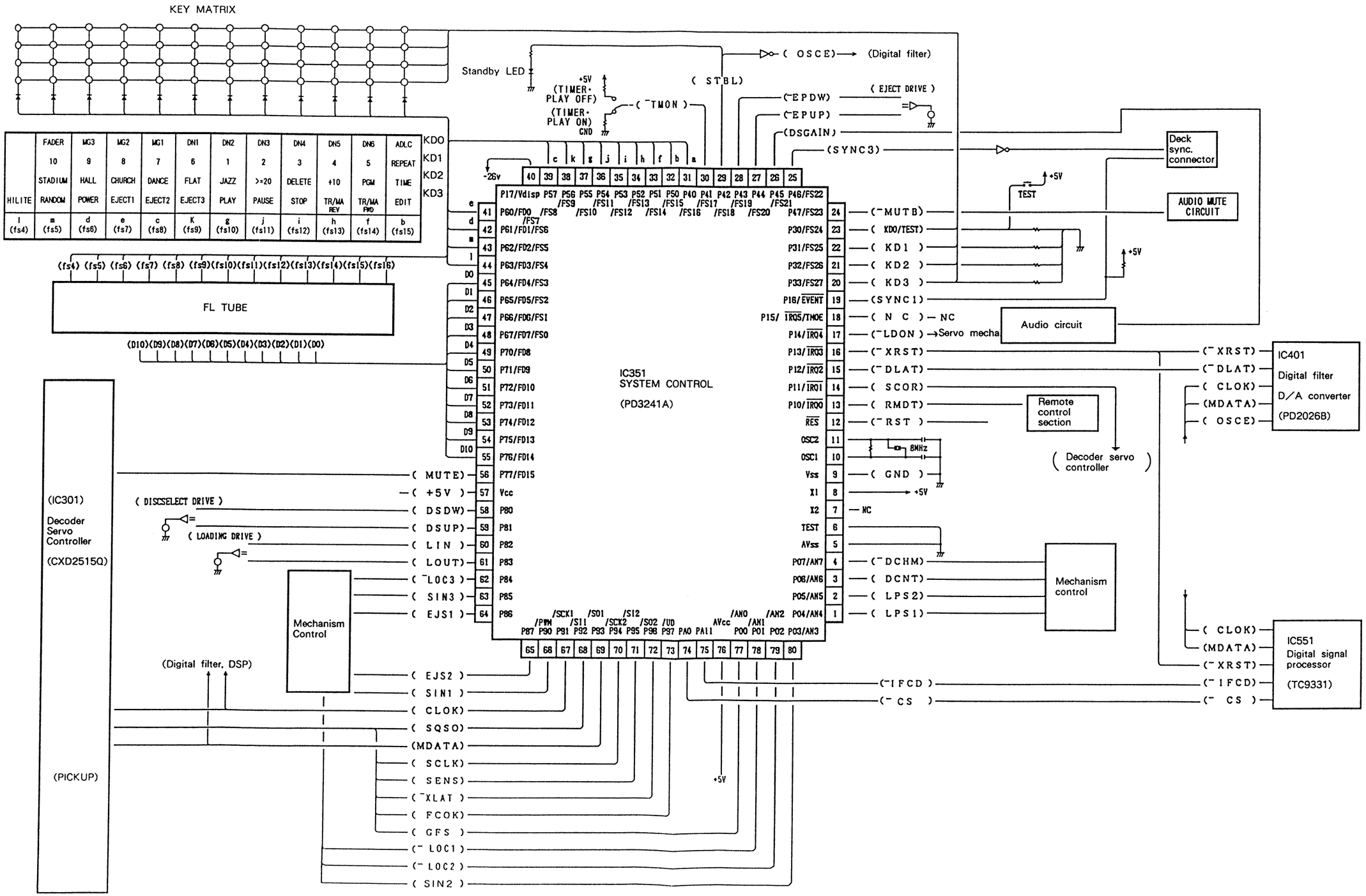




SCH—4 POWER SW, DISPLAY BOARD ASSEMBLY

POWER SW, DISPLAY BOARD ASSEMBLY **SCH—4**

5. BLOCK DIAGRAM


KEY MATRIX
FADER 10 STADIUM RANDOM
MG3 9 HALL POWER
MG2 8 CHURCH EJECT1
MG1 7 DANCE EJECT2
DN1 6 FLAT EJECT3
DN2 1 JAZZ PLAY
DN3 2 >=20 PAUSE
DN4 3 DELETE STOP
DN5 4 +10 TR/MA REV
DN6 5 PGM TR/MA FWD
ADLC REPEAT TIME EDIT
HILITE
KD0
KD1
KD2
KD3
(fs4) (fs5) (fs6) (fs7) (fs8) (fs9) (fs10) (fs11) (fs12) (fs13) (fs14) (fs15) (fs16)
FL TUBE
(D10) (D9) (D8) (D7) (D6) (D5) (D4) (D3) (D2) (D1) (D0)
Standby LED
+5V
(TIMER• PLAY OFF)
(TIMER• PLAY ON)
GND
(¯TMON)
(OSCE) → (Digital filter)
(STBL)
(¯EPDW)
(¯EPUP)
(EJECT DRIVE)
(DSGAIN)
(SYNC3)
Deck sync. connector
AUDIO MUTE CIRCUIT
TEST
+5V
-26v
IC351
SYSTEM CONTROL
(PD3241A)
P17/Vdisp /FS9 P57 /FS11 P56 /FS13 P55 /FS15 P54 /FS17 P53 /FS19 P52 /FS21 P51 P50 P40 P41 P42 P43 P44 P45 P46/FS22
P60/FD0 /FS8 /FS7 P61/FD1/FS6 P62/FD2/FS5 P63/FD3/FS4 P64/FD4/FS3 P65/FD5/FS2 P66/FD6/FS1 P67/FD7/FS0 P70/FD8 P71/FD9 P72/FD10 P73/FD11 P74/FD12 P75/FD13 P76/FD14 P77/FD15
P47/FS23 P30/FS24 P31/FS25 P32/FS26 P33/FS27
P16/EVENT P15/ IRQ5/TM0E P14/IRQ4 P13/IRQ3 P12/IRQ2 P11/IRQ1 P10/IRQ0 RES OSC2 OSC1 Vss XI X2 TEST AVss P07/AN7 P06/AN6 P05/AN5 P04/AN4
P87 P90 P91 P92 P93 P94 P95 P96 P97 PA0 PA11 P00 P01 P02 P03/AN3
/PWM /SCK1 /SI1 /SO1 /SCK2 /SI2 /SO2 /UD AVcc /AN0 /AN1 /AN2
(MUTB) (KDO/TEST) (KD1) (KD2) (KD3) (SYNC1) (N C) — NC (¯LDON) →Servo mecha (¯XRST) (¯DLAT) (SCOR) (RMDT) (¯RST) 8MHz (GND) +5V NC (¯DCHM) (DCNT) (LPS2) (LPS1)
Audio circuit
Remote control section
(Decoder servo controller)
Mechanism control
(¯XRST) (¯DLAT) (CLOK) (MDATA) (OSCE)
IC401
Digital filter
D/A converter
(PD2026B)
(CLOK) (MDATA) (¯XRST) (¯IFCD) (¯ CS)
IC551
Digital signal processor
(TC9331)
(IC301)
Decoder Servo Controller
(CXD2515Q)
(PICKUP)
(MUTE) (+5V) (DSDW) (DSUP) (LIN) (LOUT) (¯LOC3) (SIN3) (EJS1)
(DISCSELECT DRIVE)
(LOADING DRIVE)
Mechanism Control
(Digital filter, DSP)
(EJS2) (SIN1) (CLOK) (SQSO) (MDATA) (SCLK) (SENS) (¯XLAT) (FCOK) (GFS) (¯ LOC1) (¯ LOC2) (SIN2)
(¯IFCD) (¯ CS)
+5V

6. PCB PARTS LIST

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560 Ω → 56 × 10^1 → 561 ····· RD1/8PM 5 6 1 J
47k Ω → 47 × 10^3 → 473 ····· RD1/4PS 4 7 3 J
0.5 Ω → 0R5 ····· RN2H 0 R 5 K
1 Ω → 010 ····· RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562 × 10^1 → 5621 ····· RN1/4PC 5 6 2 1 F

Mark	No.	Description	Part No.
		LIST OF ASSEMBLIES	
NSP		MOTHER BOARD ASSEMBLY	PWM1779
		├MAIN BOARD ASSEMBLY	PWZ2569
NSP		└CONNECTOR BOARD ASSEMBLY	PWZ2573
NSP		SUB BOARD ASSEMBLY	PWM1785
		├DISPLAY BOARD ASSEMBLY	PWZ2577
NSP		├POWER SW BOARD ASSEMBLY	PWZ2579
NSP		└HEADPHONE BOARD ASSEMBLY	PWZ2580
		DSP BOARD ASSEMBLY	PWX1288
NSP		MECHANISM BOARD ASSEMBLY	PWX1192
NSP		MECHANISM PCB ASSEMBLY	PWM1383
NSP		SENSOR BOARD ASSEMBLY	PWM1689
		MAIN BOARD ASSEMBLY	
		SEMICONDUCTORS	
	IC406		BA15218
	IC301		CXD2515Q
⚠	IC201, IC203		LA6517
⚠	IC202		LA6520
	IC405, IC481		NJM4558DX
	IC401		PD2026B
	IC351		PD3241A
⚠	IC20		PQ05RR12
	Q391		2SC1740S
	Q403, Q404, Q481, Q482		2SD2144S
	Q453, Q454		2SJ103
	Q362, Q405, Q451, Q452, Q483, Q484		DTC124ES
⚠	D11-D14, D52		11ES2
	D391-D397, D451-D454, D481, D482		1SS254
	D54		MTZJ20A
		COILS	
	L351, L371, L401		LAU010K
	L352		LAUR22K
	L391, L392, L395, L396, L402		LAUR47K
		CAPACITORS	
	C435-C438		CCCCH050C50
	C310		CCCCH101J50
	C403		CCCCH120J50
	C404		CCCCH220J50
	C439, C440		CCCCH330J50
	C429, C430		CCCCH390J50
	C354, C393		CCCSL101J50
	C331		CCCSL181J50
	C203, C204, C208, C209, C213, C214, C332		CCCSL331J50
	C52		CEAS101M35
	C26		CEAS102M16
	C433, C434		CEAS220M25
	C211, C212, C216, C217, C303, C431, C432		CEAS330M16
	C25		CEAS332M16
	C54		CEAS470M35
	C27, C29, C302, C351		CEAS471M6R3
	C309		CEASR47M50
	C421		CFTXA103J50
	C397, C413-C416		CFTXA104J50
	C441, C442		CFTXA152J50
	C218, C308		CGCYX103K25
	C307		CGCYX473K25
	C306		CKCYB152K50
	C311		CKCYB182K50
	C334		CKCYB222K50
	C11, C13, C15-C18, C205, C210, C215, C219, C301, C313, C352, C353, C461		CKCYF103Z50
	C417		CKCYF473Z50
		RESISTORS	
	ALL RESISTORS		RD1/6M□□□J
		OTHERS	
	CN351 CONNECTOR (36P)		HLEM36
	JA401 PIN JACK (2P)		PKB10
	JA391, JA392 REMOTE CONTROL JACK		PKN10
	JA393 MINI JACK		PKN10
	X401 CRYSTAL RESONATOR (16.9344MHz)		PSS10
⚠	TERMINAL		RKC-0
	X351 CERAMIC RESONATOR		VSS10

Mark	No.	Description	Part No.

CONNECTOR BOARD ASSEMBLY

OTHERS

	CN131	CONNECTOR (12P) 12FM-1.0ST

DISPLAY BOARD ASSEMBLY

SEMICONDUCTORS

	Q701-Q707	DTC124ES
	D701-D712	1SS254

SWITCHES

	S701-S739, S741-S743	PSG1006

RESISTORS

	ALL RESISTORS	RD1/6PM□□□J

OTHERS

	CN701	CONNECTOR (36P) HLEM36R
	V701	FL INDICATOR TUBE PEL1075
		REMOTE CONTROL SENSOR HC-177

POWER SW BOARD ASSEMBLY

SEMICONDUCTORS

	D801	PCX1019

SWITCHES

	S801-S803	PSG1006
	S804	RSH1017

RESISTORS

	ALL RESISTORS	RD1/6PM□□□J

HEADPHONE BOARD ASSEMBLY

COILS

	L501-L503	LAUR22K

CAPACITORS

	C501, C502	CKCYF103Z50
	C503	CKCYF473Z50

RESISTORS

	VR501 (5KB)	PCS1003

OTHERS

	JA501	HEADPHONE JACK RKN1002

DSP BOARD ASSEMBLY

SEMICONDUCTORS

	IC552	GGC1016 (TC51832ASPL-10)
	IC551	TC9331F

CAPACITORS

	C552, C555	CFTXA104J50
	C551	CKCYB102K50
	C553, C554	CKCYF103Z50

RESISTORS

	ALL RESISTORS	RD1/6PM□□□J

Mark	No.	Description	Part No.

MECHANISM BOARD ASSEMBLY

SWITCHES

	S610	DSG1016

MECHANISM PCB ASSEMBLY

SWITCHES

	S953, S956, S958	DSG1015
	S951, S952	DSG1016
	S954, S955, S957	RSK1003

SENSOR BOARD ASSEMBLY

SEMICONDUCTORS

	Q901	GP1A52HR

SWITCHES

	S901	DSG1016

CAPACITORS

	C901	CEJA100M16

RESISTORS

	ALL RESISTORS	RD1/6PM□□□J

7. ADJUSTMENTS

7.1 HEIGHT ADJUSTMENT OF THE SENSOR PLATE

1. Adjust screw Ⓐ until the top of the sensor plate is 7mm above the main chassis. (Figure 7-2)
2. Activate TEST MODE. (See page 42.)
3. Insert the CD magazine into the Opening of MAGAZINE [3].
   (The tray for DISC 1 is automatically loaded.)
4. Press DISC 6 of the DISC NUMBER buttons twice in succession. (The tray for DISC 6 is loaded.)
5. Remove CN206 to fix the DISC SELECT motor.
   (For the location of CN206, see figure 1 on page 42)
6. Press DISC 1 of the DISC NUMBER buttons twice in succession. (The turn drive lever stops at the loading start position.)
7. Check that the upper side of the turn drive lever is 0mm $^{+0mm}_{-0.2mm}$ above the top of the DISC 6 tray (tray 6).
   (Figure 7-2, MAGAZINE [3])
8. When the check is completed, connect CN206.
   (at least 15 seconds after step 6 is completed)
   - If the upper side position of the turn drive lever is slanted upward to the plus direction, turn screw Ⓐ clockwise to fine-adjust the sensor plate mounting position downward.
   - After readjusting screw Ⓐ , press the STOP(□) button and repeat steps 4 through 6.
   - If the upper side position of the turn drive lever is slanted downward to the minus direction, turn screw Ⓐ counterclockwise. Then press the STOP(□) button and repeat steps 4 through 6.
9. Eject the CD magazine by pressing the MAGAZINE [3] EJECT(≙) button.
10. Insert the CD magazine into the Opening of MAGAZINE [1].
    (The tray for DISC 1 is automatically loaded.)
11. Press DISC 6 of the DISC NUMBER buttons twice in succession. (The tray for DISC 6 is loaded.)
12. Remove CN206 to lock the DISC SELECT motor.
    (For the location of CN206, see figure 1 on page 42)
13. Press DISC 1 of the DISC NUMBER buttons twice in succession. (The turn drive lever stops at the loading start position.)
14. Check that the upper side of the turn drive lever is 0mm $^{+0.2mm}_{-0.6mm}$ above the top of the DISC 6 tray (tray 6).
    (Figure 7-2, MAGAZINE [1])
15. When the check is completed, connect CN206.
    (at least 15 seconds after step 13 is completed.)
16. Eject the CD magazine by pressing the MAGAZINE [1] EJECT(≙) button.
    Insert the CD magazine in the opening of MAGAZINE [2] and perform the same check for MAGAZINE [2] as for MAGAZINE [1].

Note: In disc selection, the servo mechanism section moves vertically. This servo mechanism section is designed to reduce the elevation speed at the position of the tray preceding the specified tray of the disc. This permits the elevation movement to be stopped exactly at specified disc tray.

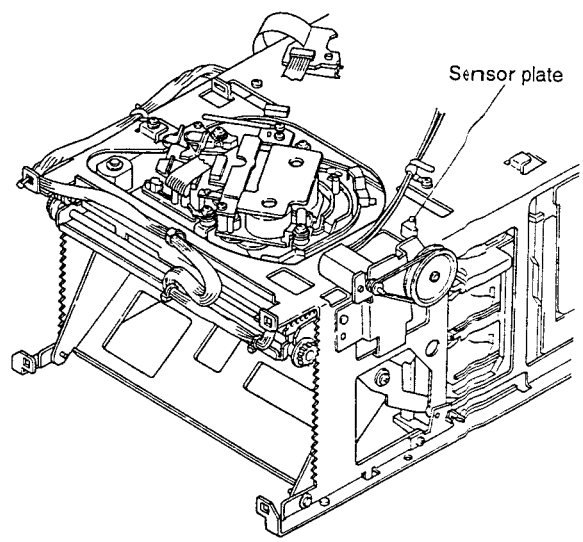


Figure. 7-1

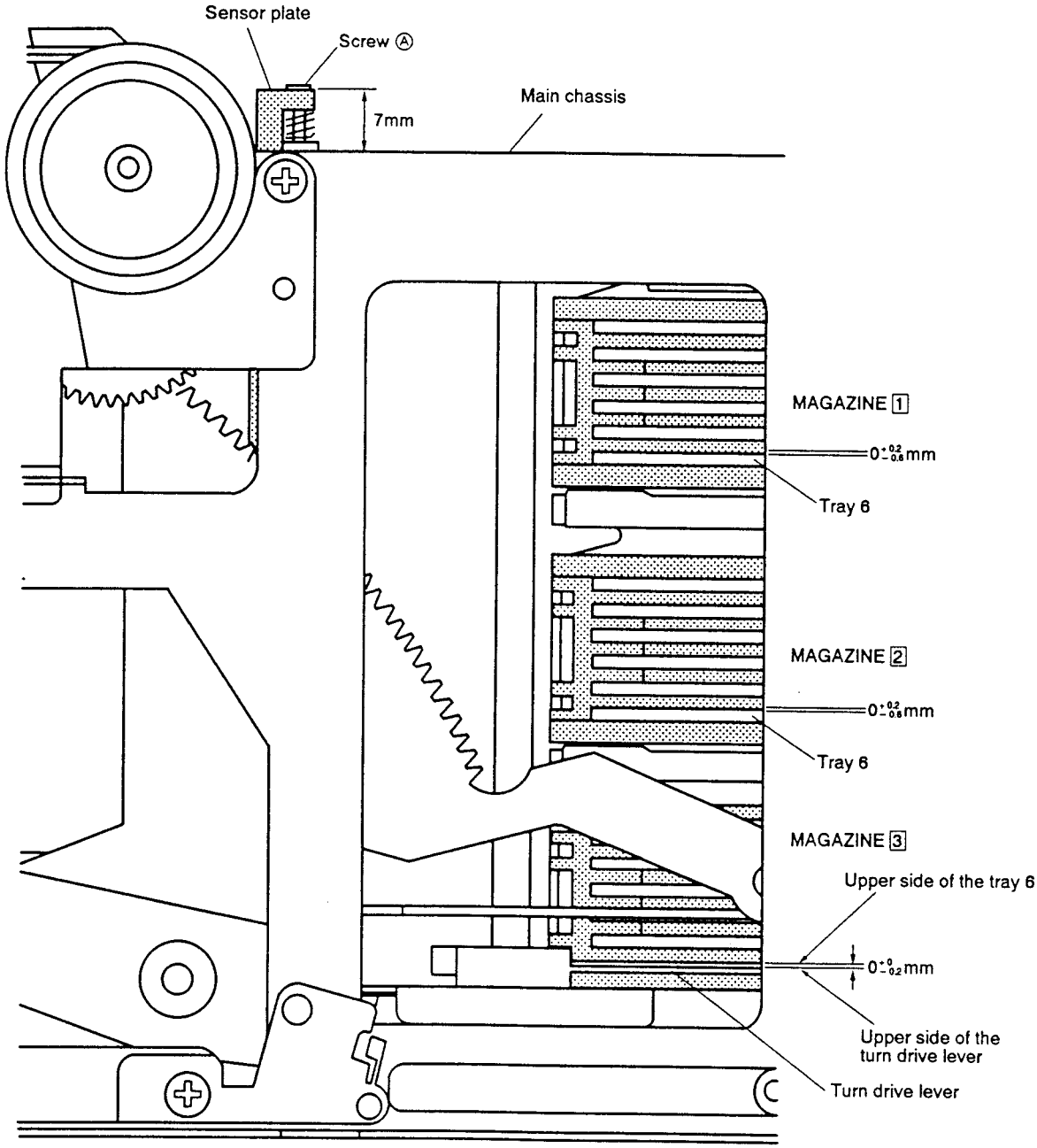

Sensor plate
Screw Ⓐ
7mm
Main chassis
MAGAZINE 1
0 +0.2 -0.8 mm
Tray 6
MAGAZINE 2
0 +0.2 -0.8 mm
Tray 6
MAGAZINE 3
Upper side of the tray 6
0 +0 -0.2 mm
Upper side of the turn drive lever
Turn drive lever

Figure. 7-2

7.2 CD PLAYER ADJUSTMENT

● Adjustment Methods

If a disc player is adjusted incorrectly or inadequately, it may malfunction or not work at all even though there is nothing at all wrong with the pickup or the circuitry. Adjust correctly following the adjustment procedure.

● Adjustment Items/Verification Items and Order

If the specified values cannot be obtained or no adjustment is possible by performing the verifications or adjustments described in steps 1 – 4, the pickup block may be defective.

● Measuring Instruments and Tools

Step	Item	Test Point	Adjustment Location
1	Focus S curve verification		None
2	Tracking error balance verification	TP1, Pin 2 (TRK. ERR)	None
3	Pickup radial/tangential direction tilt adjustment	TP1, Pin 1 (RF)	Radial tilt adjustment screw, Tangential tilt adjustment screw
4	RF level verification	TP1, Pin 1 (RF)	None

Note : The digital servo IC (CXD2515Q) being used in this set has the following functions and does not provide focus offset, focus servo loop gain and tracking servo loop gain adjustments.

1. Average function
   For accurate servo control, VC, FCS. ERR and RF average measurements are performed and the measured values are compensated through a compensation circuit.
   Thus, volume control for FCS. OFS adjustment is not provided.
2. Auto gain control function
   The gain inside the filter is automatically adjusted to obtain a proper gain in the servo loop. This function permits the optimum gain to be obtained on each disc.
   Thus, volume controls for FCS. GAIN and TRK. GAIN adjustments are not provided.
   The gain adjustment is done before TOC reading.

● **Abbreviation table**

FCS. ERR	:Focus Error
TRK. ERR	:Tracking Error
FCS GAN	:Focus Gain
TRK GAN	:Tracking Gain
FCS. IN	:Focus In
TRK. IN	:Tracking In

1. Dual trace oscilloscope (10:1 probe)
2. Low-frequency oscillator
3. Test disc (YEDS-7)
4. Standard tools

● Test Point and Adjustment Variable Resistor Positions

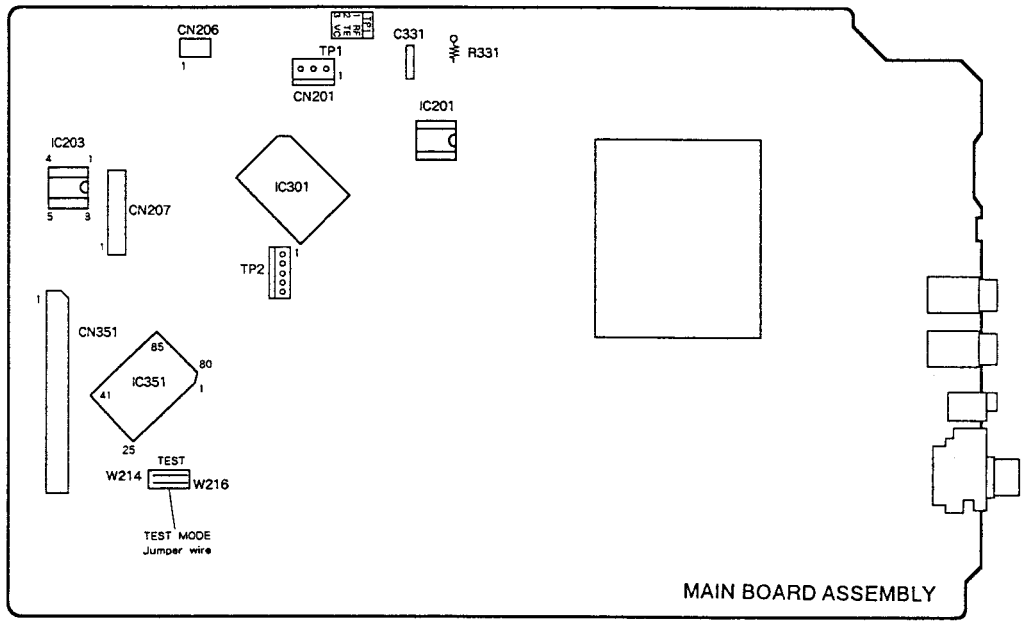


Figure 1 Adjustment Locations

● Notes

1. Use a 10:1 probe for the oscilloscope.
2. All the knob positions (settings) for the oscilloscope in the adjustment procedures are for when a 10:1 probe is used.

● Test Mode

These models have a test mode so that the adjustments and checks required for service can be carried out easily. When these models are in test mode, the keys on the front panel work differently from normal. Adjustments and checks can be carried out by operating these keys with the correct procedure. For these models, all adjustments are carried out in test mode.

[Setting these models to test mode]

How to set this model into test mode.
1. Unplug the power cord from the AC socket.
2. Short the test mode jumper wires. (See Figure 1.)
3. Plug the power cord back into the AC socket.

When the test mode is set correctly, the display is different from what it usually is when the power is turned on. If the display is still the same as usual, test mode has not been set correctly, so repeat Steps 1 – 3.

[Release from test mode]

Here is the procedure for releasing the test mode:

1. Press the STOP key and stop all operations.
2. Unplug the power cord from the AC socket.

[Operations of the keys in test mode]

Code	Key Name	Function In Test Mode	Explanation
	PGM (PROGRAM)	Focus servo close	The laser diode is lit up and the focus actuator is lifted up, then lowered slowly and the focus servo is closed at the point where the objective lens is focused on the disc. With the player in this state, if you lightly rotate the stopped disc by hand, you can hear the sound the focus servo. If you can hear this sound, the focus servo is operating correctly. If you press this key with no disc mounted, the laser diode lights up, the focus actuator is pulled up, then the actuator is lowered and raised three times and returned to its original position.
▷	PLAY	Spindle servo ON	Starts the spindle motor in the clockwise direction and when the disc rotation reaches the prescribed speed (about 500 rpm at the inner periphery), sets the spindle servo in a closed loop. Be careful. Pressing this key when there is no disc mounted makes the spindle motor run at the maximum speed. If the focus servo does not go correctly into a closed loop or the laser light shines on the mirror section at the outermost periphery of the disc, the same symptom is occurred.
□□	PAUSE	Tracking servo close/open	Pressing this key when the focus servo and spindle servo are operating correctly in closed loops puts the tracking servo into a closed loop, displays the track number being played back and the elapsed time on the front panel, and outputs the playback signal. If the elapsed time is not displayed or not counted correctly or the audio is not played back correctly, it may be that the laser is shining on the section with no sound recorded at the outer edge of the disc, that something is out of adjustment, or that there is some other problem. This key is a toggle key and open/close the tracking servo alternately. This key has no effect if no disc is mounted.

Code	Key Name	Function In Test Mode	Explanation
⏮	MANUAL/ TRACK SEARCH REV	Carriage reverse (inwards)	Moves the pickup position toward the inner diameter of the disc. When this key is pressed with the tracking servo in a closed loop, the tracking servo automatically goes into an open loop. Since the motor does not automatically stop at the mechanical end point in test mode, be careful with this operation.
⏭	MANUAL/ TRACK SEARCH FWD	Carriage forward (outwards)	Moves the pickup position toward the outer diameter of the disc. When this key is pressed with the tracking servo in a closed loop, the tracking servo automatically goes into an open loop. Since the motor does not automatically stop at the mechanical end point in test mode, be careful with this operation.
	REPEAT	Auto gain adjustment	• Perform the tracking and focus gain adjustments. • The adjustment is performed when this key is pressed during playback. For a proper adjustment, perform it at the inner periphery of a disc. When the key is pressed in other statuses than playback, be sure to disconnect the AC power cord from the AC socket and perform the necessary settings for test mode again.
□	STOP	Stop	Initializes and the disc rotation stops. The pickup and disc remain where they are when this key is pressed.
⏏	EJECT	CD magazine eject	Stores Disc 1 in the CD magazine, then ejects the CD magazine. However, even though the CD magazine is ejected, the pickup does not return to the park position. Even if the CD magazine is mounted again, the pickup remains where it is.

Note : • When inserting the CD magazine, disc 1 of the magazine is loaded automatically.
• DISC NUMBER buttons (DISC 1 – DISC 6) and MAGAZINE buttons (MAGAZINE 1 – MAGAZINE 3) function properly on the test mode conditions.
If it does not function, when you press the DISC NUMBER button once, press the same button twice more.
When a CD magazine is inserted into MAGAZINE [3], pressing any of DISC NUMBER buttons (DISC 1 – DISC 6) selects the disc in MAGAZINE [1].

[How to play back a disc in test mode]

In test mode, since the servos operate independently, playing back a disc requires that you operate the keys in the correct order to close the servos.

Here is the key operation sequence for playing back a disc in test mode.

[PGM(PROGRAM)]	Lights up the laser diode and closes the focus servo.
⇩	
[PLAY ▷]	Starts the spindle motor and closes the spindle servo.
⇩	
[PAUSE ▯▯]	Closes the tracking servo.
⇩	
[REPEAT]	Auto gain adjustment.

Wait at least 2-3 seconds between each of these operations.

1. Focus Error Signal (Focus S Curve) Verification

● Objective ● Symptom when out of adjustment	To judge whether the pickup is ok or not by observing the focus error signal. The pickup is judged from the amplitude of the tracking error signal (as discussed in the section on adjusting the tracking error balance) and the waveform for the focus error signal.		
● Measurement instrument connections	Connect the oscilloscope to R331 lead wire (marking side) and GND of it to TP1, Pin 3 (VC). [Settings] 100 mV/division 5 ms/division DC mode	● Player state ● Adjustment location ● Disc	Test mode, stop None YEDS-7

[Procedure]

1. Connect TP1 Pin 3 to ground. Short-circuit the both side of C331.
2. Mount the disc.
3. While watching the oscilloscope screen, press the PROGRAM key and observe the waveform in Figure 2 for a moment. Verify that the amplitude is at least 2.5 Vp-p and that the positive and negative amplitude are about equal. Since the waveform is only output for a moment when the PROGRAM key is pressed, press this key over and over until you have checked the waveform.

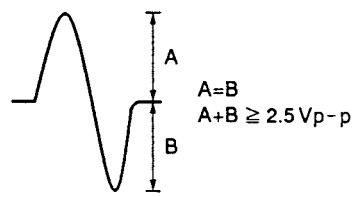


Figure 2

[Judging the pickup]

Do not judge the pickup until all the adjustment have been made correctly. In the following cases, there may be something wrong with the pickup.

1. The tracking error signal amplitude is extremely small (less than 2 Vp-p).
2. The focus error signal amplitude is extremely small (less than 2.5 Vp-p).
3. The positive and negative amplitudes of the focus error signal are extremely asymmetrical (2 : 1 ratio or more).
4. The RF signal is too small (less than 0.8 Vp-p) and even if VR101 (laser power) is adjusted , the RF signal can not be brought up to the standard level.

2. Tracking Error Balance Verification

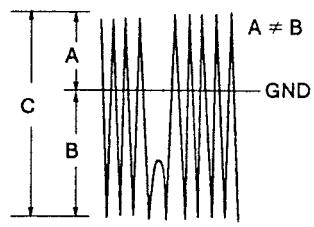
● Objective ● Symptom when out of adjustment	To verify that there is no variation in the sensitivity of the tracking photo diode. Play does not start or track search is impossible.		
● Measurement instrument connections	Connect the oscilloscope to TP1, Pin 2 (TRK. ERR) and GND of it to TP1, Pin 3 (VC). (This connection may be via a low pass filter.) [Settings] 50 mV/division 5 ms/division DC mode	● Player state ● Adjustment location ● Disc	Test mode, focus and spindle servos closed and tracking servo open None YEDS-7

[Procedure]

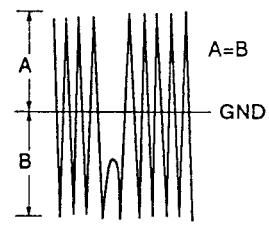
1. Move the pickup to midway across the disc (R=35 mm) with the MANUAL/TRACK SEARCH FWD ▷▷ ▷▷| or REV |◁◁ ◁◁ key.
2. Press the PGM (PROGRAM) key, then the PLAY ▷ key in that order to close the focus servo then the spindle servo.
3. Line up the bright line (ground) at the center of the oscilloscope screen and put the oscilloscope into DC mode.
4. Supposing that the positive amplitude of the tracking error signal at TP1, pin 2 (TRK ERR) is (A) and the negative amplitude is (B), the following expression is satisfied.

When $A \geqq B$, $\frac{A-B}{C} \times \frac{1}{2} \leqq 0.05$

When $A < B$, $\frac{B-A}{C} \times \frac{1}{2} \leqq 0.05$



When there is a DC component



When there is no DC component

3. Pickup Radial/Tangential Tilt Adjustment

• Objective • Symptom when out of adjustment	To adjust the angle of the pickup relative to the disc so that the laser beams are shone straight down into the disc for the best read out of the RF signals. Sound broken;some discs can be played but not others.		
• Measurement instrument connections	Connect the oscilloscope to TP1, Pin 1 (RF) and GND of it to TP1, Pin 3 (VC). [Settings] 20 mV/division 200 ns/division AC mode	• Player state • Adjustment location • Disc	Test mode, play Pickup radial tilt adjustment screw and tangential tilt adjustment screw YEDS-7

[Procedure]

1. Press the MANUAL/TRACK SEARCH FWD ▷▷▷▷| or REV |◁◁◁◁ key to move the pickup to halfway across the disc (R=35mm).
   Press the PGM(PROGRAM) key, the PLAY ▷ key, then the PAUSE ▯▯ key in that order to close the respective servos and put the player into play mode.
2. First, adjust the radial tilt adjustment screw with a Phillips screwdriver so that the eye pattern (the diamond shape at the center of the RF signal) can be seen the most clearly.
3. Next, adjust the tangential tilt adjustment screw with a Phillips screwdriver so that the eye pattern (the diamond shape at the center of the RF signal) can be seen the most clearly (Figure 4).
4. Adjust the radial tilt adjustment screw and the tangential tilt adjustment screw again so that the eye pattern can be seen the most clearly. As necessary, adjust the two screws alternately so that the eye pattern can be seen the most clearly.
5. When the adjustment is completed, lock the radial and tangential adjustment screw.

Note:Radial and tangential mean the directions relative to the disc shown in Figure 3.

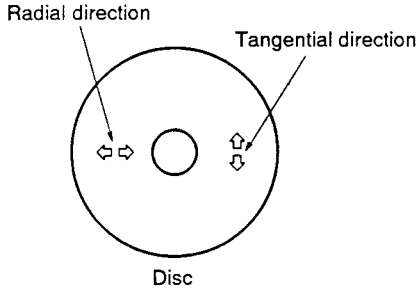
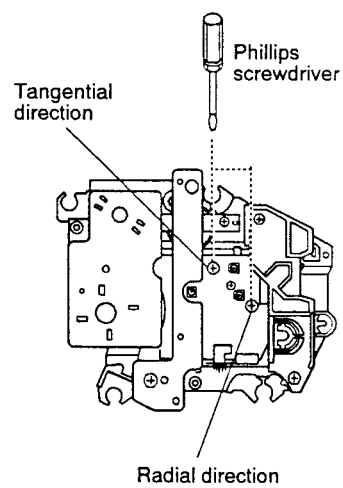


Figure 3



Adjustment locations

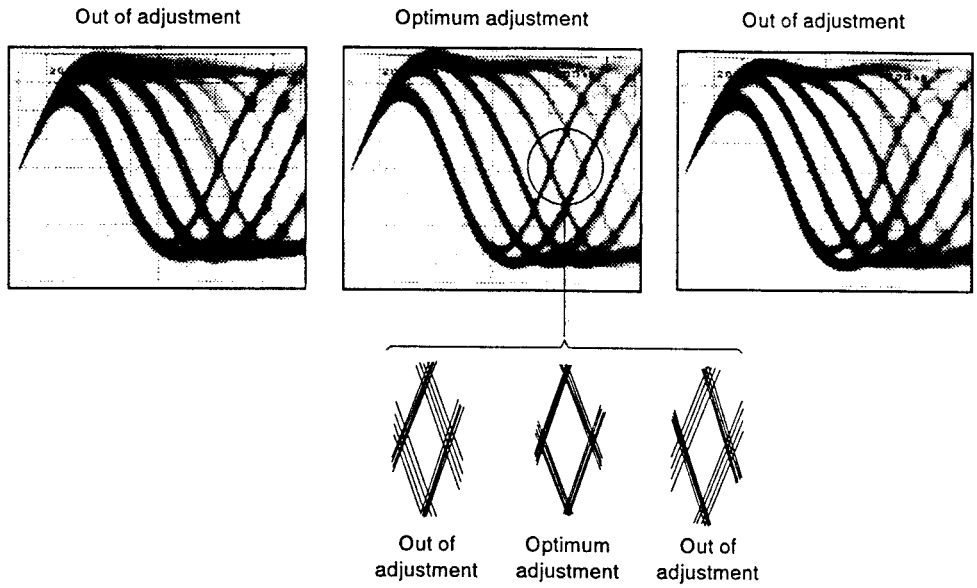


Figure 4 Eye pattern

4. RF Level Verification

● Objective ● Symptom when out of adjustment	To verify the playback RF signal amplitude No play or no search		
● Measurement instrument connections	Connect the oscilloscope to TP1, Pin 1 (RF) and GND of it to TP1, Pin 3(VC). [Settings] 50 mV/division 10 ms/division AC mode	● Player state ● Adjustment location ● Disc	Test mode, play None YEDS-7

[Procedure]

1. Move the pickup to midway across the disc (R=35 mm) with the MANUAL/TRACK SEARCH FWD ▷▷▷▷| or REV |◁◁◁◁ key, then press the PGM (PROGRAM) key, the PLAY ▷ key, then the PAUSE ▯▯ key in that order to close the respective servos and put the player into play mode.
2. Verify the RF signal amplitude is 1.2 Vp-p ± 0.2 V.

8. IC INFORMATION

• The information shown in the list is basic information and may not correspond exactly to that shown in the schematic diagrams.

1. PD3241A(IC351)
SYSTEM CONTROL

● Pin Function

Pin No.	Mark	Name	I/O	Function	Reset	Initial
1	PO4/AN4	LPS1	I	Loading position SW1 (L: Home)	–	–
2	PO5/AN5	LPS2	I	Loading position SW2 (L: Clamp)	–	–
3	PO6/AN6	DCNT	I	Disc count pulse input	–	–
4	PO7/AN7	DCHM	I	Disc selector home SW (L: Home)	–	–
5	AVss	Not used	GND	(Reference voltage for A/D converter): GND	–	–
6	TEST	Not used	GND	(Test pin for maker): GND	–	–
7	X2	Not used	–	(Sub-clock oscillator connecting pin): OPEN	–	–
8	X1	Not used	+5V	(Sub-clock oscillator connecting pin): Vcc	–	–
9	Vss	Vss	–	GND	–	–
10	OSC1	OSC1	–	System clock oscillator connecting pin. 8 MHz	–	–
11	OSC2	OSC2	–		–	–
12	RES	$\overline{\text{RST}}$	I	CPU reset (L: Reset)	–	–
13	P10/IRQ0	RMDT	I	Remote control data input	–	–
14	P11/IRQ1	SCOR	I	Sub-code sync. S0+S1 input	–	–
15	P12/IRQ2	$\overline{\text{DLAT}}$	O	DAC control data. Latch pulse	–	H
16	P13/IRQ3	$\overline{\text{XRST}}$	O	Reset output for each LSI	–	L
17	P14/IRQ4	$\overline{\text{LDON}}$	O	Laser diode output (L: ON, H: OFF)	–	H
18	P15/IRQ5/TMOE	Not used	O	(OPEN)	–	L
19	P16/EVENT	SYNC1	I	Syncro input	–	–
20	P33/FS27	KD3	I	Key data input	–	–
21	P32/FS26	KD2	I			
22	P31/FS25	KD1	I			
23	P30/FS24	KD0/TEST	I	Key data input/Test mode request input (H: Test, L: Normal mode)	–	–
24	P47/FS23	$\overline{\text{MUTB}}$	O	Muting output (L: Mute)	–	L
25	P46/FS22	SYNC3	O	Syncro output	–	L
26	P45/FS21	DSGAIN	O	Analog gain control output for DSP	–	L
27	P44/FS20	$\overline{\text{EPUP}}$	O	Output port for eject. When up: EPUP=L, EPDW=H. When down: EPUP=H, EPDW=L	–	H
28	P43/FS19	$\overline{\text{EPDW}}$	O		–	H
29	P42/FS18	STBL	O	Standby LED output (L: Goes off, H: Lights). OSCE output	–	L
30	P41/FS17	$\overline{\text{TMON}}$	I	Timer switch input (H: OFF, L: ON)	–	–
31	P40/FS16	SEG A	O	Segment output for FL drive	– 25V	– 26V
32	P50/FS15	SEG B	O			
33	P51/FS14	SEG F	O			
34	P52/FS13	SEG H	O			
35	P53/FS12	SEG I	O			
36	P54/FS11	SEG J	O			
37	P55/FS10	SEG G	O			
38	P56/FS9	SEG K	O			
39	P57/FS8	SEG C	O			
40	P17/Vdisp	Vdisp	I	–26V	–	–

Pin No.	Mark	Name	I/O	Function	Reset	Initial
41	P60/FD0/FS7	SEG E	O	Segment output for FL drive	– 26V	– 26V
42	P61/FD1/FS6	SEG D	O			
43	P62/FD2/FS5	SEG M	O			
44	P63/FD3/FS4	SEG L	O			
45	P64/FD4/FS3	D0	O	Digit output for FL drive	–	⎍
46	P65/FD5/FS2	D1	O			
47	P66/FD6/FS1	D2	O			
48	P67/FD7/FS0	D3	O			
49	P70/FD8	D4	O			
50	P71/FD9	D5	O			
51	P72/FD10	D6	O			
52	P73/FD11	D7	O			
53	P74/FD12	D8	O			
54	P75/FD13	D9	O			
55	P76/FD14	D10	O			
56	P77/FD15	MUTE	O	Muting output (H: Mute)	–	H
57	Vcc	Vcc	–	+5V	–	–
58	P80	DSDW	O	Disc selector output port. When up: DSUP=H, DSDW=L. When down: DSUP=L, DSDW=H	–	L
59	P81	DSUP	O		–	L
60	P82	LIN	O	Disc tray output port. When returning: LIN=H, LOUT=L. When loading: LIN=L, LOUT=H	–	L
61	P83	LOUT	O		–	L
62	P84	$\overline{\text{LOC3}}$	I	Magazine 3. IN/OUT SW (L: IN)	–	–
63	P85	SIN3	I	Magazine 3. 6 discs/single SW (H: single)	–	–
64	P86	EJS1	I	Eject mechanism position SW. Eject: EJS1, 2=H. Home: EJS1, 2=L	–	–
65	P87	EJS2	I		–	–
66	P90/PWM	SIN1	I	Magazine 1. 6 discs/single SW (H: single)	–	–
67	P91/SCK1	CLOK	O	LSI serial clock output	–	H
68	P92/SI1	SQSO	I	Sub-code Q data serial input	–	–
69	P93/SO1	MDATA	O	LSI control data serial output	–	L
70	P94/SCK2	SCLK	O	SENS. Clock output for reading serial data	–	H
71	P95/SI2/C2	SENS	I	LSI operation condition multiple modes input	–	–
72	P96/SO2	$\overline{\text{XLAT}}$	O	LSI control data. Latch pulse	–	H
73	P97/UD	FCOK	I	Focus OK input (H: OK)	–	–
74	PA0	$\overline{\text{CS}}$	O	Chip select output for DSP	–	H
75	PA1	$\overline{\text{IFCD}}$	O	Command/data discrimination output for DSP	–	H
76	AVcc	AVcc	+5V	+5V	–	–
77	PO0/AN0	GFS	I	Frame sync lock input (H: OK)	–	–
78	PO1/AN1	$\overline{\text{LOC1}}$	I	Magazine 1. IN/OUT SW (L: IN)	–	–
79	PO2/AN2	$\overline{\text{LOC2}}$	I	Magazine 2. IN/OUT SW (L: IN)	–	–
80	PO3/AN3	SIN2	I	Magazine 2. 6 discs/single SW (H: single)	–	–

9. FOR KC, HEM AND SD TYPES

CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

PD-TM3/KC, HEM, SD and KU have the same construction except for the following:

Mark	Symbol & Description	Part No.				Remarks
		KU type	KC type	HEM type	SD type	
NSP	Mother board assembly	PWM1779	PWM1779	PWM1780	PWM1781	
	Main board assembly	PWZ2569	PWZ2569	PWZ2570	PWZ2571	
⚠	Strain relief	CM – 22C	CM – 22C	CM – 22B	CM – 22B	
⚠	AC power cord	PDG1015	PDG1015	PDG1003	PDG1013	
⚠	Power transformer (AC120V)	PTT1282	PTT1282	.....	.....	
⚠	Power transformer (AC220 – 230/230 – 240V)	.....	.....	PT1283	.....	
⚠	Power transformer (AC110/120 – 127/220/240V)	.....	.....	.....	PTT1284	
⚠	Voltage selector (AC110/120 – 127/220/240V)	.....	.....	.....	PSB1002	(Rear base)
	Display window	PAM1603	PAM1603	PAM1618	PAM1603	
NSP	Rear base	PNA1931	PNA1996	PNA1997	PNA1999	
	Packing case	PHG1883	PHG1953	PHG1953	PHG1953	
	Connection cord with mini plug	PDE – 319	PDE – 319	.....	PDE – 319	
	Single magazine assembly	.....	.....	.....	PXA1386	Accessory
	PP case	.....	.....	.....	PYY1159	Accessory
	Polyethelene bag	Z21 – 038	.....	.....	Z21 – 016	
	Operating instructions (English)	PRB1188	.....	.....	PRB1188	
	Operating instructions (English/French)	.....	PRE1181	PRE1181	.....	
	Operating instructions (German/Italian/Dutch/Swedish/ Spanish/Portuguese)	.....	.....	PRF1065	.....	

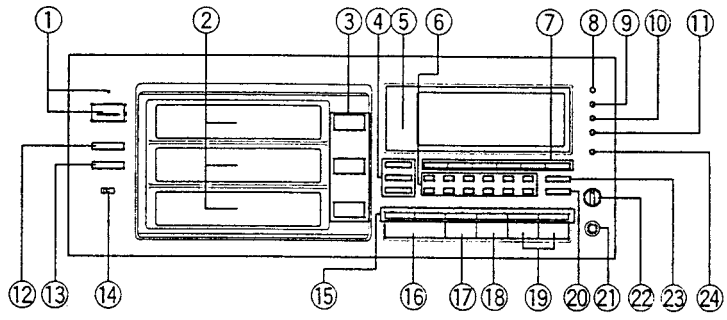
MAIN BOARD ASSEMBLY

PWZ2570, PWZ2571 and PWZ2569 have the same construction except for the following:

Mark	Symbol & Description	Part No.			Remarks
		PWZ2569	PWZ2570	PWZ2571	
⚠	IC31	.....	ICP – N10	ICP – N10	
	D391 – D394	1SS254	.....	1SS254	
	L391	LAUR47K	.....	LAUR47K	
	L392	LAUR47K	.....	LAUR47K	
	C393	CCCSL101J50	.....	CCCSL101J50	
	R391	RD1/6PM244J	.....	RD1/6PM244J	
	R392	RD1/6PM102J	.....	RD1/6PM102J	

10. PANEL FACILITIES

FRONT PANEL



① **POWER STANDBY/ON switch and STANDBY indicator**
② **Magazine insertion slots**
③ **Eject buttons (▲) (1 – 3)**
④ **MAGAZINE buttons (MAGAZINE 1 – MAGAZINE 3)**
⑤ **Remote sensor**
Receives the signal from the remote control unit.
⑥ **Digit buttons (1-10, +10, ≧20)**
⑦ **DISC number buttons (1 – 6)**
⑧ **ADLC button**
⑨ **REPEAT button**
⑩ **TIME button**
⑪ **FADER button**
⑫ **RANDOM button**
⑬ **HI-LITE SCAN button**
⑭ **TIMER switch (OFF/PLAY)**
⑮ **DIGITAL SIGNAL PROCESSOR buttons (FLAT/JAZZ/CHURCH/DANCE/HALL/ STADIUM)**
⑯ **Play button (►)**
⑰ **Pause button (II)**
⑱ **Stop button (■)**
⑲ **Track/Manual search buttons (|◄◄ ◄◄/►► ►►|)**
⑳ **DELETE button**
㉑ **Headphones jack (PHONES)**
㉒ **Headphones volume (PHONES LEVEL)**
㉓ **PROGRAM button**
㉔ **EDIT button (• COMPU PGM/ • • TIME FADE)**

11. SPECIFICATIONS

1. General

Type ..... Compact disc digital audio system
Power requirements
European models ..... AC 220 - 230 V, 50/60 Hz
U.K., Australian models ..... AC 230 - 240 V, 50/60 Hz
U.S., Canadian models ..... AC 120 V, 60 Hz
Other models ..... AC 110/120 - 127/220/240V (switchable) 50/60 Hz
Power consumption ..... 14 W
Operating temperature ..... +5°C - +35°C (+41°F - +95°F)
Weight ..... 6.5 kg (14 lb 5 oz)
External dimensions ..... 420(W) X 342(D) X 174.5(H) mm 16-9/16(W) X13-7/16(D) X 6-15/16(H) in

2. Audio section

Frequency response ..... 2 Hz - 20 kHz
S/N ratio ..... 102 dB or more (EIAJ)
Dynamic range ..... 96 dB or more (EIAJ)
Channel separation ..... 96 dB or more (EIAJ)
Harmonic distortion ..... 0.003 % or less (EIAJ)
Output voltage ..... 2.0 V
Wow and flutter ..... less than ±0.001% (W.PEAK) (below measurable level) (EIAJ)
Channels ..... 2-channel (stereo)

3. Output terminal

Audio line output
Headphone jack with volume control
Control input/output jacks (Canadian model only)
CD-DECK SYNCHRO jack

4. Functions

Number of discs to be stored - maximum 18.

Basic Operation Buttons
- PLAY, PAUSE, STOP

Search Function
- Magazine Search
- Disc Search
- Track Search
- Manual Search

Programming
- Maximum 48 steps
- Pause
- Program Check/Correction (remote control unit)
- Program Clear (single track or all tracks)
- Delete Play

Repeat Functions
- 1 Track Repeat
- All Discs Repeat
- Program Repeat
- Random Play Repeat
- Delete Play Repeat
- Delete Random Play Repeat
- Magazine Hi-Lite Scan Repeat

Random Play
- Random Play (repeat also available)
- Delete Random Play (repeat also available)

Switching Display
Time consumed, remaining time (track/disc), and total time

Timer Start

ADLC
Automatic Digital Level Controller

Digital Level Controller
Volume control can be done.

DSP (Digital Signal Processor) function

One-touch Fade
Fade-in and fade-out possible.

Compu Program Editing
Selects the tracks for both sides of the tape within the specified time.

Time Fade Editing
Selects the tracks within the specified time. Playback stops with a fade-out.

Magazine Hi-Lite Scan (repeat also available)
- DISC SCAN
- TRACK SCAN

Power On/Off (remote control unit)

Automatic Power On Function

Power Down Eject Function